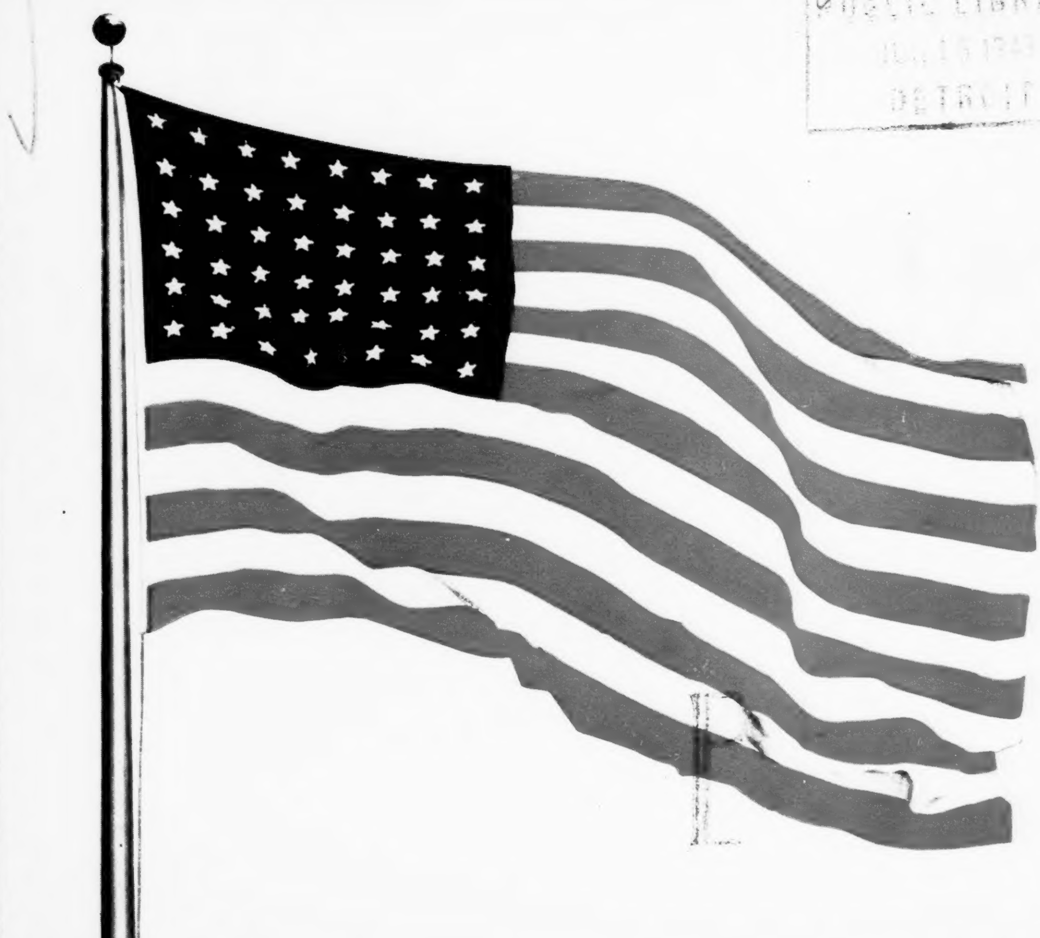
JUNE, 1943



Newsletter No. 6
JUNE, 1943

Published by Rubber Chemicals Division of DU PONT

Thermoflex A and Neozone A Inhibit Flex-Cracking in Reclaimed Rubber Stocks

DUE to present conditions, most of the rubber stocks you are now mixing contain a large quantity of reclaimed rubber. Stocks of this type are being used in services where compositions rich in crude rubber were used previously. It is now more important than ever before to build the best possible quality into these stocks and make the best possible use of available compounding ingredients.

The useful life of articles made from stocks containing large amounts of reclaimed rubber is increased by the use of Thermoflex A or Neozone A because these antioxidants also inhibit failure caused by flex-cracking.

TEST DATA—The following data illustrates the degree of resistance to flex-cracking that is imparted by Thermoflex A and Neozone A to "F" grade camelback stock. The flex ratings are based on tests run on the du Pont Flexing Machine which is illustrated in Figure I. Figure II illustrates the type of failure which occurs on this machine. A flex rating of "0" is perfect, no cracks; and a flex rating of 10 indicates that the test sample has failed completely by cracking entirely through its thickness.

Compound 1231	633	634	635
Whole Tire Reclaim	182.0	182.0	182.0
THERMOFLEX A	—	1.0	—
NEOZONE A	—	—	1.0
2-MT	0.85	0.85	0.85
ACCELERATOR 808	0.2	0.2	0.2
Zinc Oxide	2.0	2.0	2.0
Channel Carbon Black	22.5	22.5	22.5
Stearic Acid	3.0	3.0	3.0
Carbonex S	5.5	5.5	5.5
Pine Tar	2.5	2.5	2.5
Sulfur	4.0	4.0	4.0

(Slab 0.100" thick)
Press Cure: 60 minutes at 274° F.

	Flex Rating		
After 24 hours flexing	9	1	2
After 48 hours flexing	9	5	8
After 72 hours flexing	9	9	9

Similar outstanding results are obtained with these antioxidants in many other products which must have long life under dynamic service conditions. Outstanding among these applications are belt, shoe sole, pneumatic tire and certain hose stocks.

AGING IMPROVED—These antioxidants also inhibit deterioration as determined by the oxygen bomb test, not only when judged by decrease in tensile strength but also when judged by decrease in tear resistance.

Neozone A is less expensive than Thermoflex A but, of the two products, Thermoflex A is superior in preventing flex-cracking and in resisting deterioration as measured by loss of tear resistance and is well worth the added cost.

2-MT-808 ACCELERATION—Crude rubber and reclaimed rubber tread and carcass stocks accelerated with a combination of 2-MT and Accelerator 808 process safely and their vulcanizates have high resilience and excellent resistance to aging and flex-cracking. At elevated temperatures 2-MT—808 accelerated stocks retain their tensile strength and resistance to tear to an extraordinary degree.

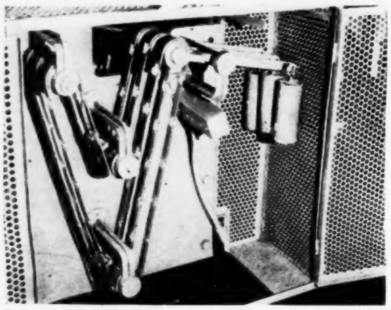


Fig. I. The Du Pont Flexing machine. Press cured samples fastened together to form an endless belt are flexed over pulleys under prescribed speed and load conditions. Samples are bent in one direction three times for each time in the reverse direction.

Fig. II. Test samples from Du Pont Flexing machine illustrate from left to right the following flex ratings: 0, 5, 10.

Through the mill

SODIUM ACETATE AS A RETARDER FOR NEOPRENE. During the warm weather months you will find sodium acetate to be of great value in the processing of neoprene compositions. Its use will counteract the tendency of these compositions to scorch during processing and to bin-cure during storage. Sodium acetate is effective with all types of neoprene and functions either in the presence or absence of accelerators. It has a pronounced effect in retarding the rate of vulcanization at temperatures under 240°F. for relatively long periods of time, while at temperatures above 240°F. the time period shortens rapidly as the temperature increases until, at normal curing temperatures, 274°F. and above, the retardation effect entirely disappears and an activating effect becomes apparent.

Sodium acetate is available in both flake and granular form. We recommend using Granular 60% Sodium Acetate because it melts at approximately 50°C. and hence disperses readily during the mixing of neoprene stocks.

A SATURATED SOLUTION OF ACCELERATOR 552 IN BENZENE when used as a wash on plies of neoprene stocks will enhance their adhesion in the vulcanized assembly. The Accelerator 552 acts as a chemical plasticizer of the neoprene surface under the influence of heat during the early stages of vulcanization. As a result, better knitting of the stock will be obtained which will give greater adhesion. This treatment is particularly advantageous for building rolls to eliminate lamination trouble.

SERVICE—Are you having difficulty in formulating compounds to meet difficult specifications? The Du Pont Rubber Laboratory Staff will be pleased to assist you.

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RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

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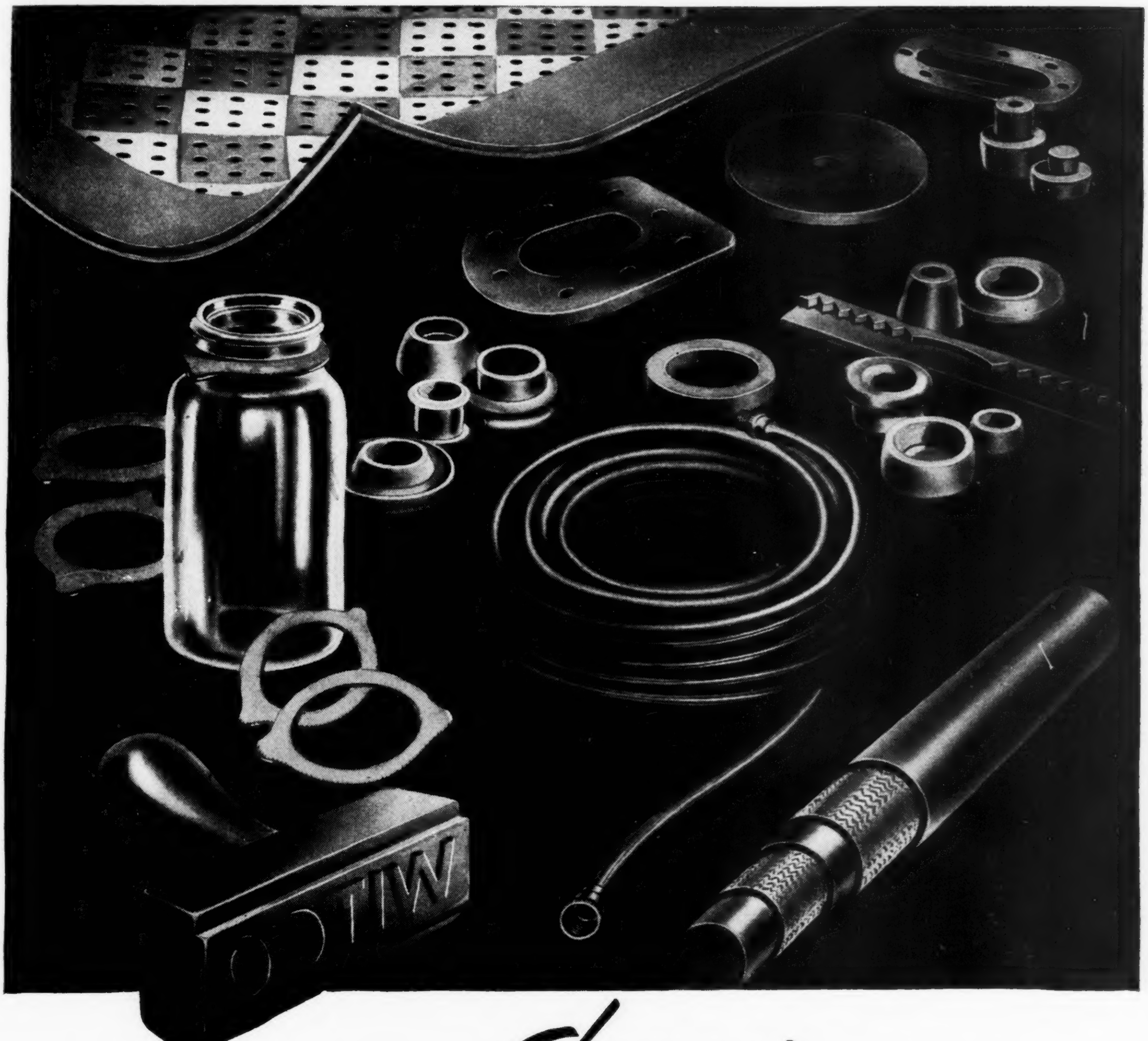

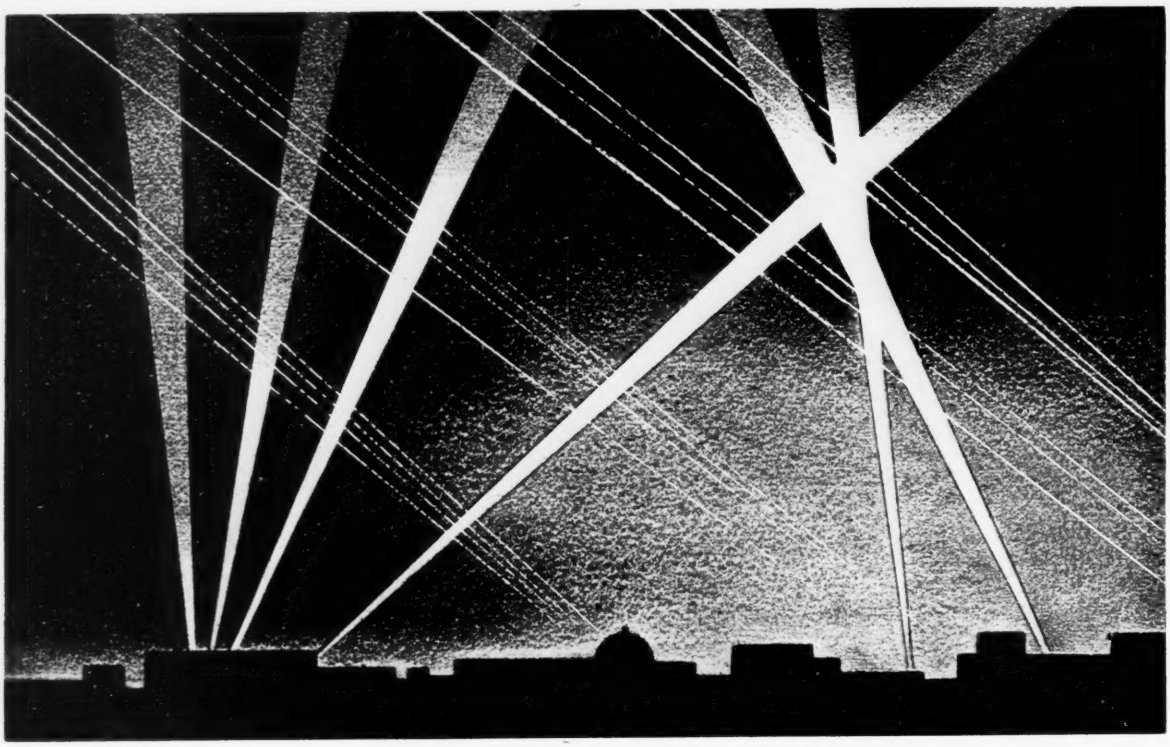

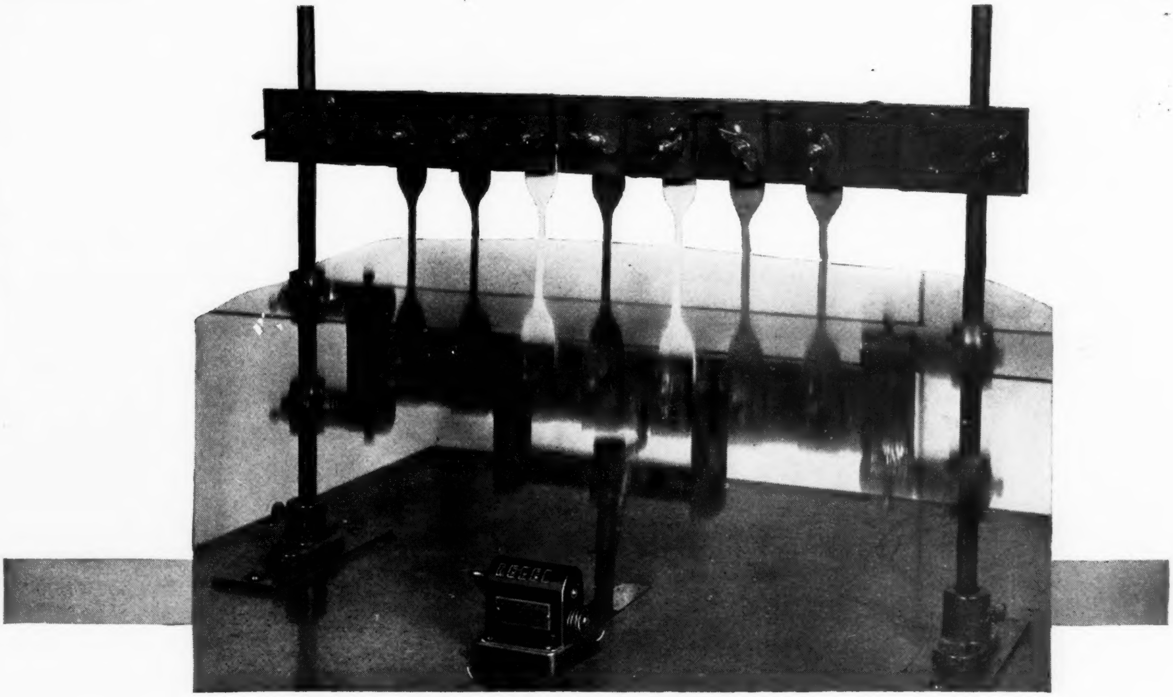

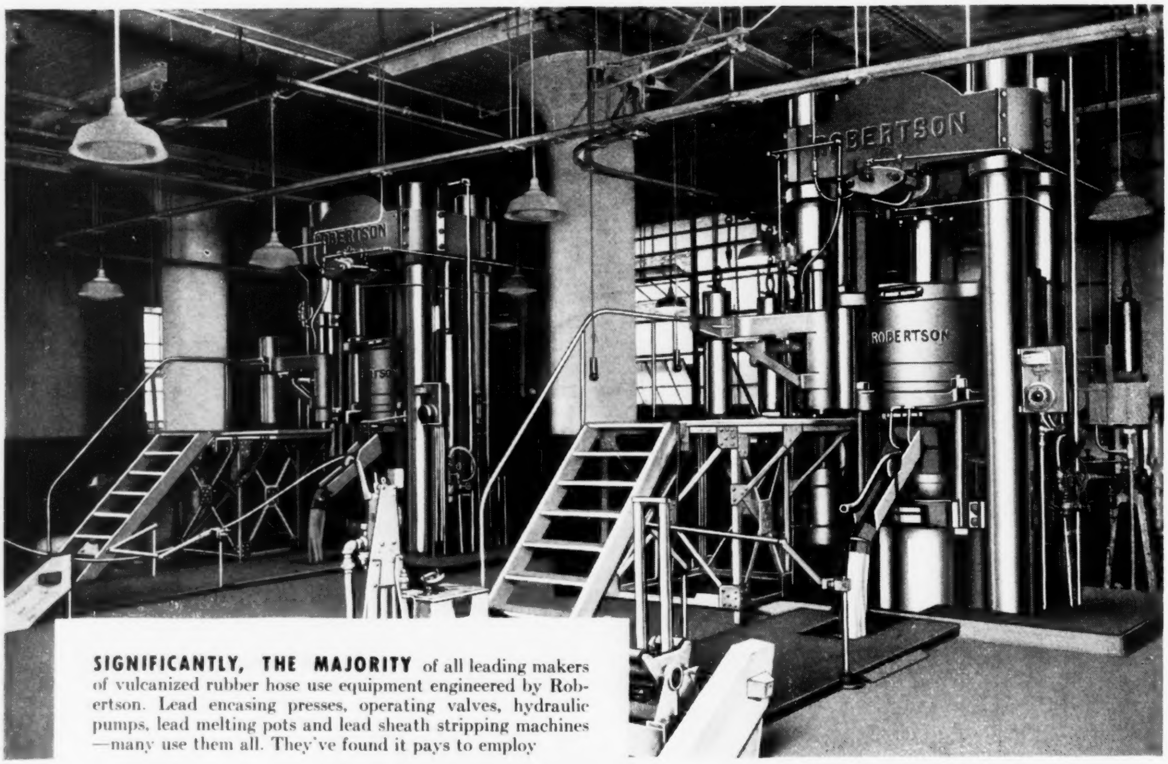

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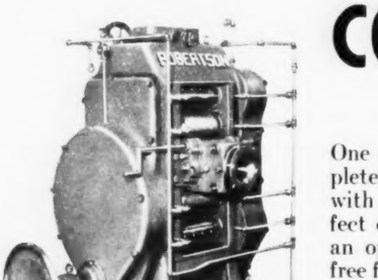

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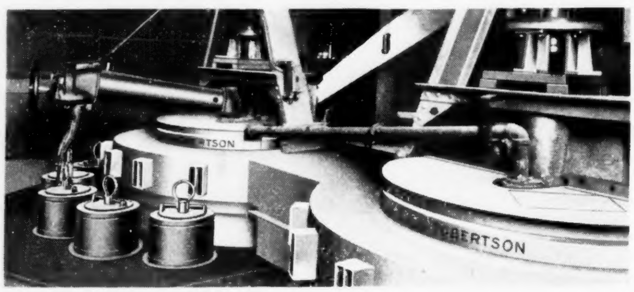

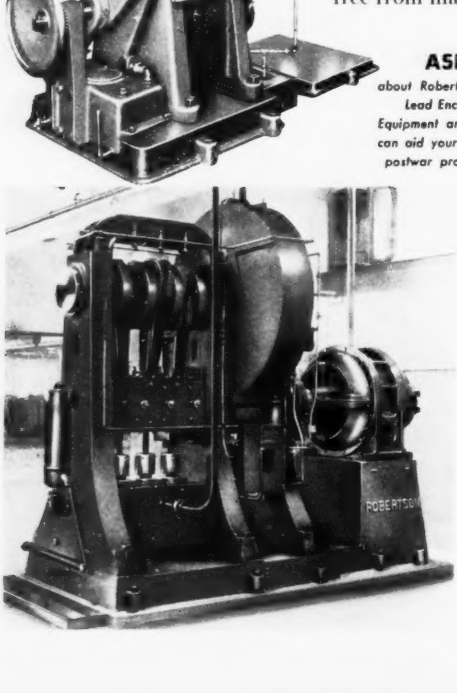

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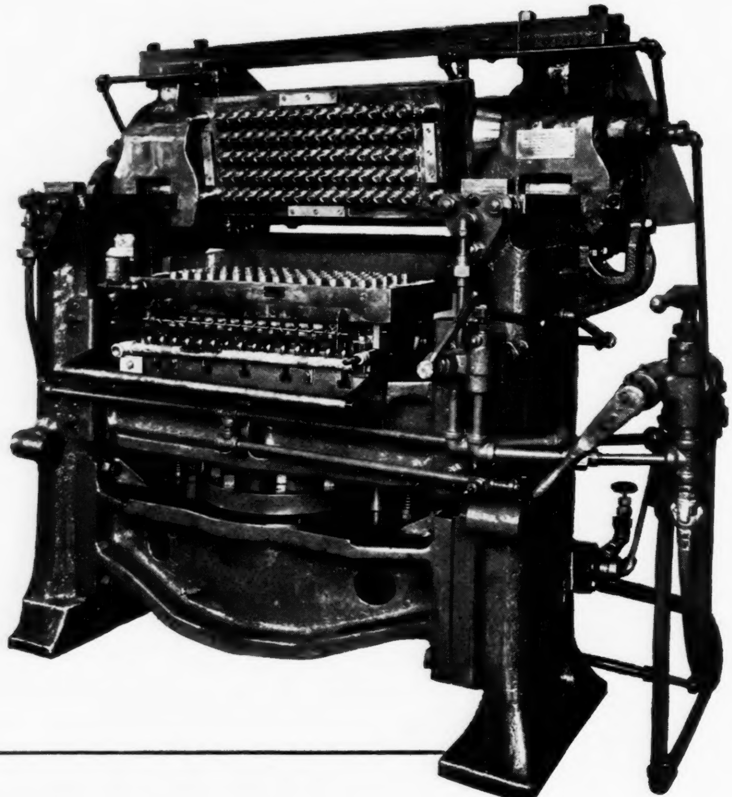

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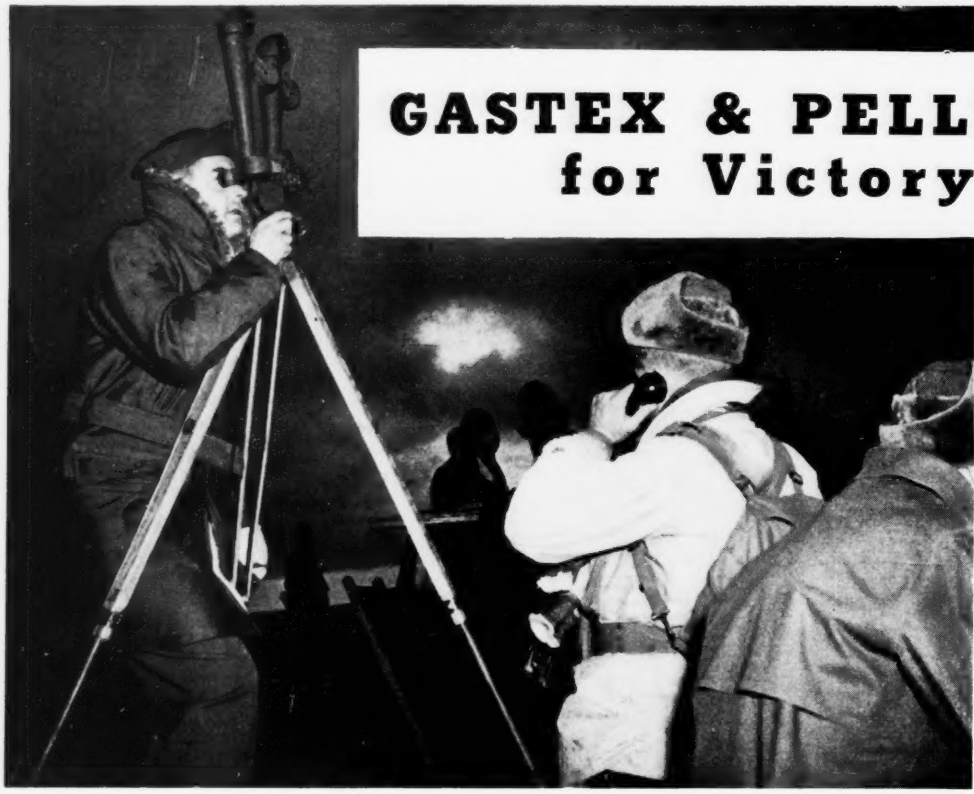

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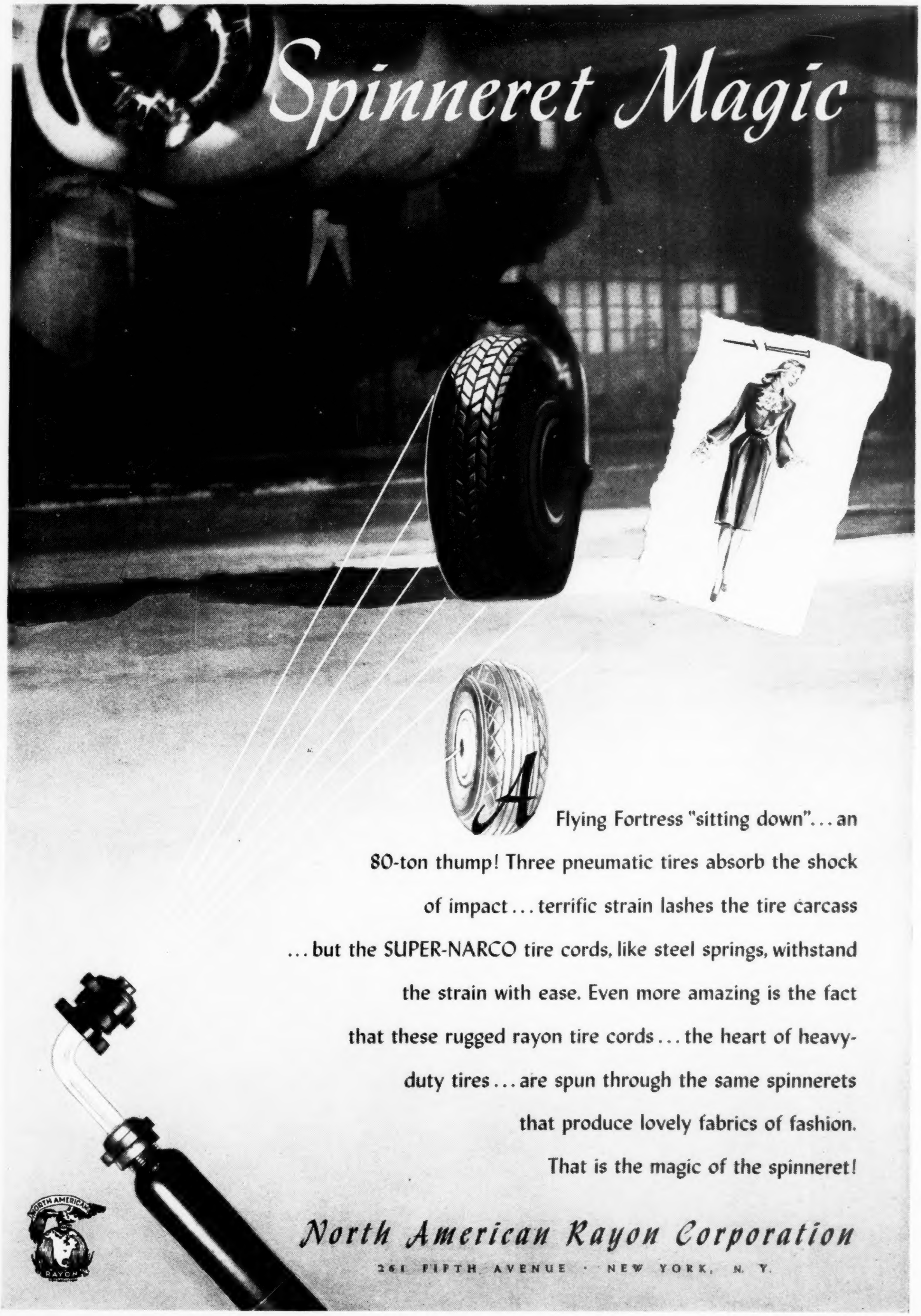
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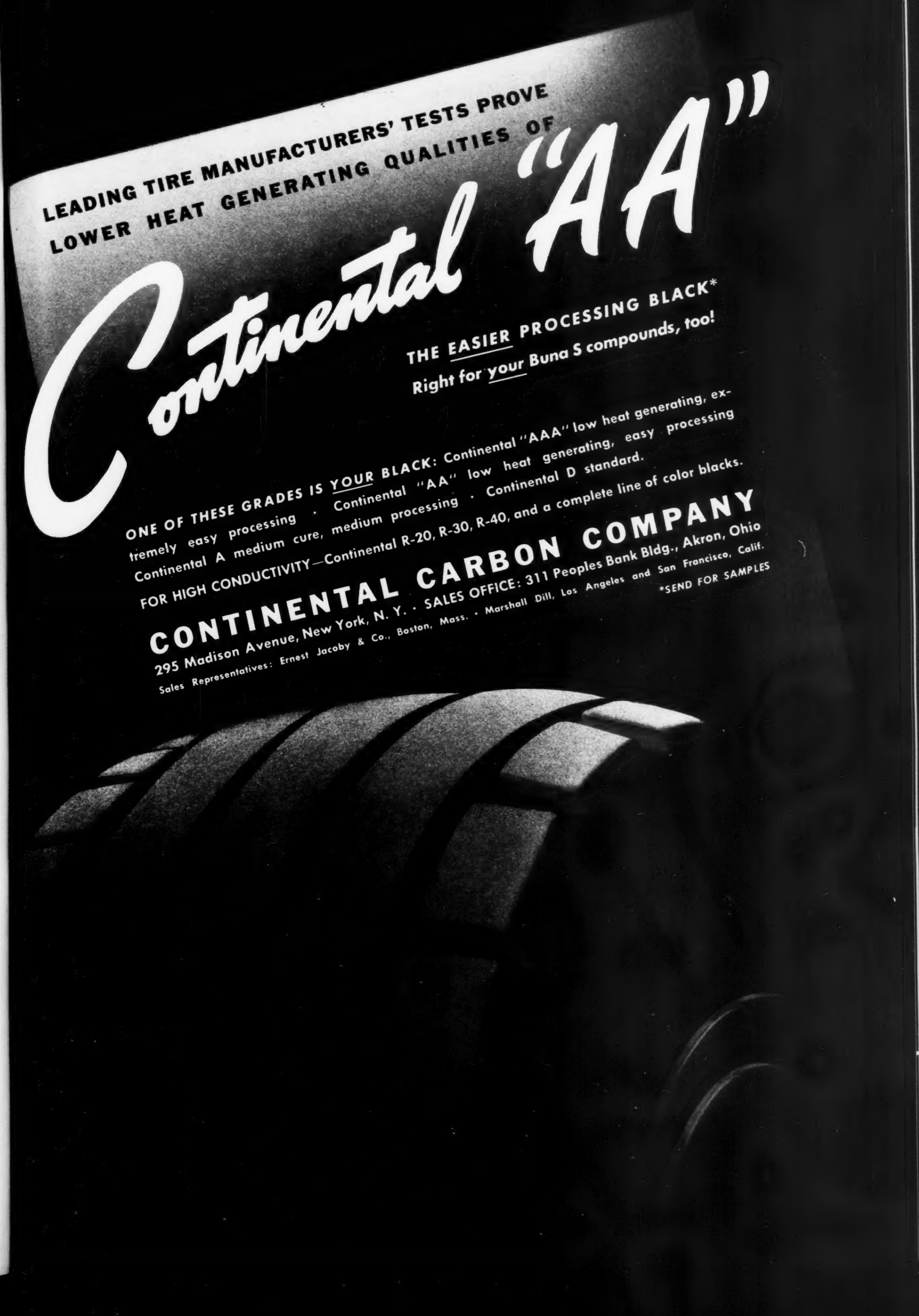
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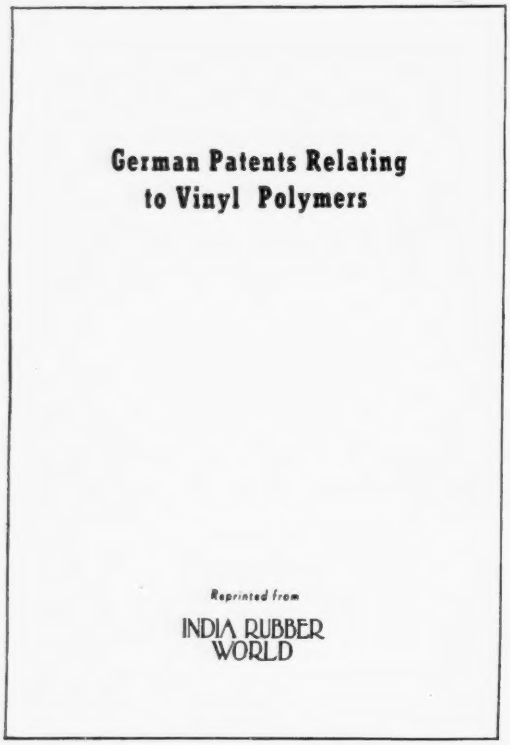

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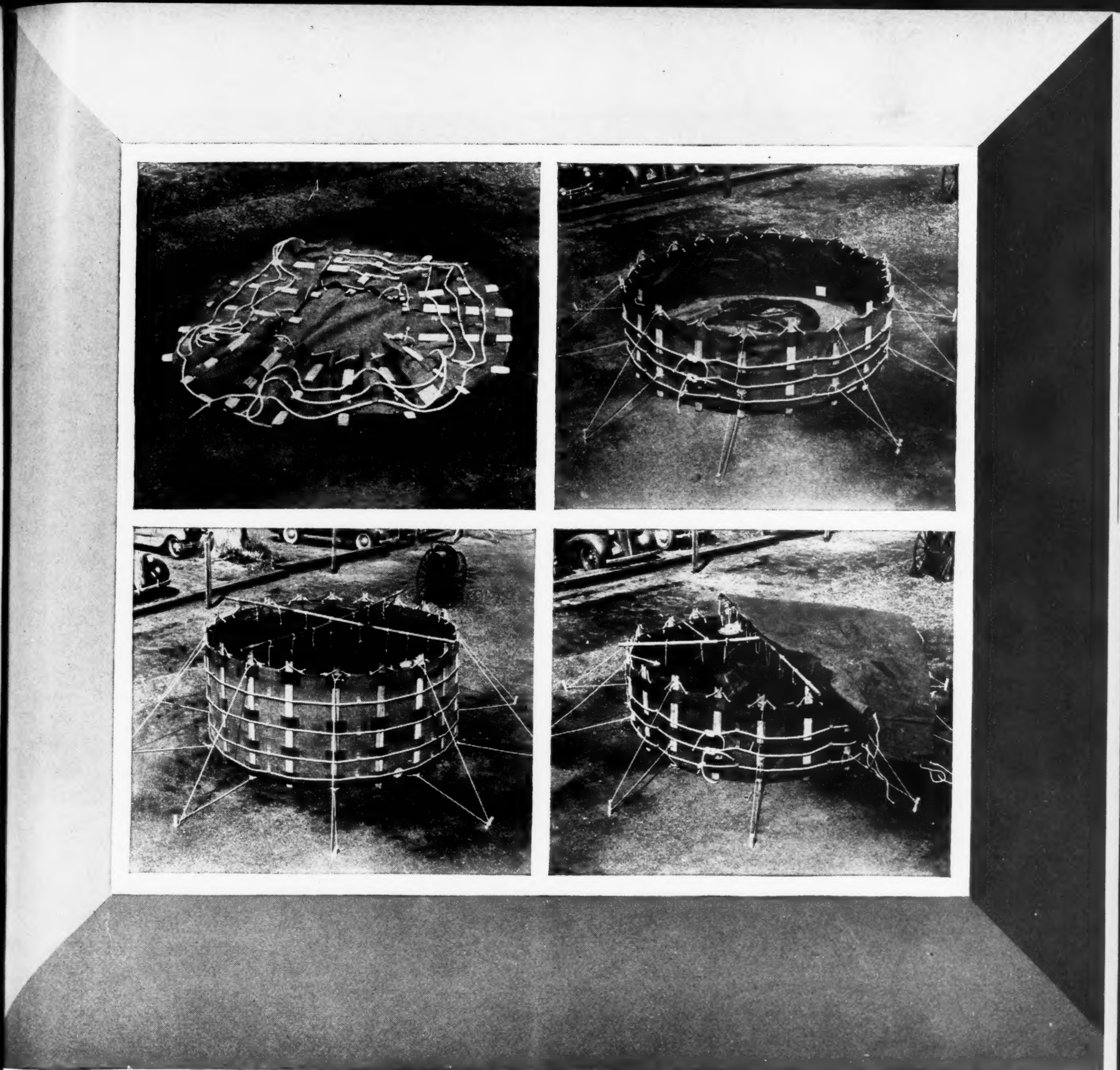

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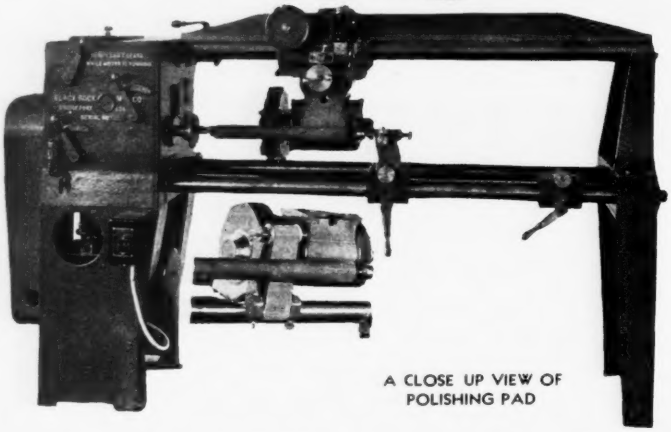

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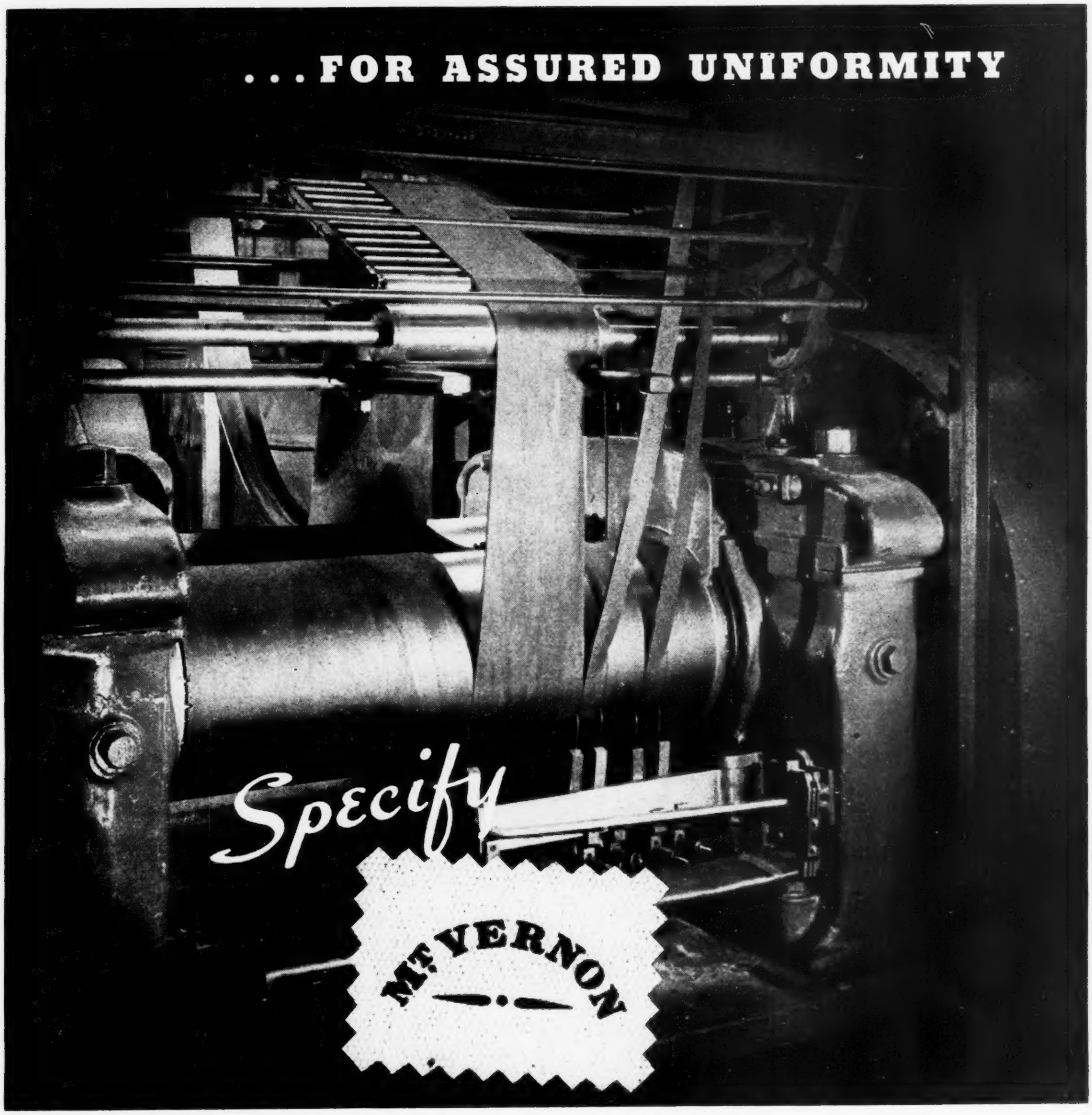

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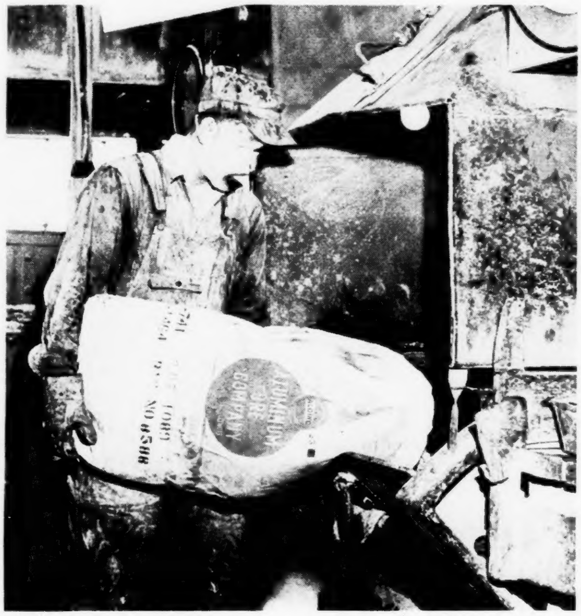

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June, 1943

VOLUME 108 NUMBER 3

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Volume 108 **New York, June, 1943** **Number 3**

Synthetic Rubber Cements—I

D. V. Sarbach[1]

A Cementing Operation in the Construction of a Reconnaissance Boat

THE manufacture of synthetic rubber and the fabrication of useful industrial products from synthetic rubber have rapidly gained during the past two years the distinction of being one of the world's foremost industrial problems. Of these useful industrial products, cements from synthetic rubber occupy a unique position in that they are frequently indispensable in the construction of countless articles vitally needed in the present war effort and for future civilian requirements. Of the number of synthetic rubbers investigated, Hycar OR-15 and Hycar OR-25 have been found to be among the most useful and versatile of the highly oil-resistant synthetics. Dried films made from cements of these polymers retain all of the oil-resistant properties of the parent material coupled with excellent adhesive strength, and, by proper compounding of the raw synthetics, cements made therefrom can be modified to meet a myriad of uses where oil resistance is of prime importance.

Cements from Hycar OR have been developed for bonding vulcanized or unvulcanized Hycar OR compounds to a large number of other materials primed with chlorinated rubber or with certain phenol formaldehyde resins. These materials include iron, steel, aluminum, chromium, copper, zinc, leather, wood, paper, fiberboard, tile, and glass. Other cements from Hycar OR have been developed which will bond vulcanized or unvulcanized Hycar OR compounds to themselves, to Perbunan, neoprene, and Koroseal, and other vinyl resins. Some Hycar OR cements are designed for splicing and repairing, for low gasoline diffusion, for low gas diffusion (hydrogen, etc.), for adhesion to fabrics, and for aiding in fusion during molding processes. Still others have been modified for use for protective coatings, oil-resistant putty, dipping operations, and for spreading compounds for fabric coatings. These cements have found valuable practical application in making and repairing bullet-sealing fuel cells both in the factory and in the field. Others are used in the manufacture of hose, industrial

[1] Research chemist, B. F. Goodrich Co., Akron, O.

Applying the Initial Ply on a Form for a Bullet-Sealing Fuel Tank

belts, airplane brake expander tubes, experimental barrage balloons, etc.

The disadvantages of many synthetic rubber cements including those made from Hycar OR are threefold. The tackiness associated with natural rubber cements is lacking to a large degree in cements made from this type of synthetic. Except in applications where tack-free films have proved an advantage, lack of tack may be compensated for by compounding the synthetic with tackifiers. The second important difference is that unpigmented synthetic cements of this type lack the high tensile strength of those made from natural rubber. The third difference is that this type of synthetic rubber cement requires certain changes in manufacturing technique not ordinarily deemed necessary with natural rubber. These changes in processing are few and simple, but fundamentally important. When such changes are not made, the resulting cement is frequently grainy or after standing for a time will tend to gell or become livery. This article is devoted chiefly to the actual manufacture of cements from Hycar OR-15[2] with a brief discussion of useful compounding principles associated with Hycar OR cement compounds. Specific adhesions are not discussed as they constitute a detailed and separate study.

Raw Material and Fundmentals of Cement Manufacture

The Hycar OR synthetics are supplied in slabs about ½-inch thick. The color ranges from cream to buff. These synthetics have a very faint sweetish odor and from all available information appear non-toxic. Sunlight has little or no discoloring action on Hycar OR. On a rubber mill the Hycar OR is found to be tougher than natural rubber and is not subject to the oxidative breakdown characteristic of the natural product. Prolonged milling does not materially soften Hycar OR, but the process *does increase solubility* and may well mean the difference between a smooth stable cement and one which will gell on standing. Properly compounded and processed cements will remain stable for from several weeks to several months.

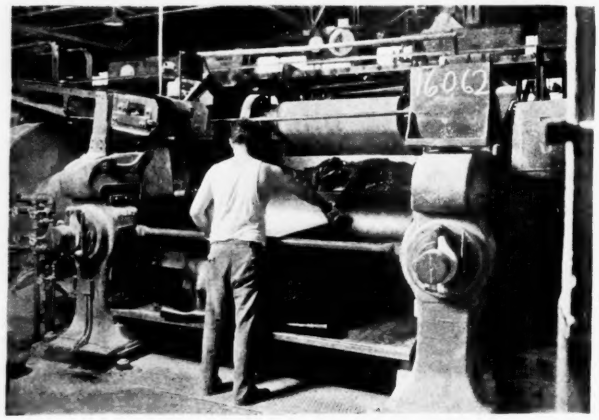
A summary of the fundamental points to remember in the manufacture of cements from Hycar OR follows:

1. Do not store the synthetic rubber in extremely hot places near steam pipes, etc.
2. Design the compound to suit the particular task for which it is intended.
3. Select solvents carefully.
4. Mill on an efficiently cooled mill so that the milling temperature of the synthetic does not rise too high. Temperatures below 160° F. are preferable.
5. Do not overload the mill. Keep a smooth rolling bank and cut back and forth continuously.
6. Give the synthetic a *minimum* breakdown or mill mastication of 15 minutes.
7. Add compounding ingredients evenly, keeping the sulphur out until last.
8. After thorough mixing and blending, sheet off and cool by dipping into cold clean water and immediately hanging up to dry.
9. Add to the solvent as soon as possible after mill mixing. If more than eight hours have elapsed after mill mixing, the batch should be remasticated for five to ten minutes on a cool mill before mixing with the solvent.
10. Mix the batch stock with the solvent in a water-jacketed cement mixer and keep the mixture reasonably cool (120° F. or less) until the cement is smooth and free from lumps. The type of mixer used is secondary to the need of keeping the cement cool.
11. Store the finished cement in a reasonably cool place in closed containers.

[2] Of the two synthetics, Hycar OR-15 and Hycar OR-25, the OR-15 variety is the more oil resistant. The term Hycar OR refers to either polymer.

[3] "Chlorobenzene" throughout this discussion refers to commercial monochlorobenzene.

[4] Initial viscosity refers to the determination made immediately after mixing.



Cutting a Compounded Batch on a Mill to Insure Uniform Blending

Viscosity Test

The viscosity measurements referred to in this study were determined by a simple test developed by the writer. A sample of Hycar OR-15 was first masticated according to a predetermined method of milling and was then dissolved by rapid stirring in a standardized apparatus under constant or specified conditions until a smooth cement resulted or until a predetermined time of mixing elapsed. The viscosity measurement is the time in seconds necessary for the cement to flow from a 25 ml. glass pipette, the lower stem of which was cut off directly below the bulb. The inside diameter of the pipette opening measured 21/128-inch. The pipette was thoroughly cleaned with chlorobenzene.[3] The limits of error were found to be 10% or less. For example, if the viscosity value was found to be 20 seconds, the check measurement could be expected to vary ±2 seconds. Closer checks were usually the rule.

Gelling observations were made by allowing the cement to flow off a smooth steel spatula. If the cement had begun to gell, it would fall off in globs instead of flowing off in a smooth stream.

It was almost invariably found that the higher the initial viscosity[4] of the cement, the more quickly the cement would gell.

Examination of the Raw Material

A. UNIFORMITY. To test the uniformity of Hycar OR-15 for cement manufacture, samples were cut from four large slabs selected at random out of a one-ton lot of the synthetic. From each of these samples a 10% pure gum cement in chlorobenzene was prepared under closely controlled conditions of milling and mixing. The initial viscosity was then measured by the method outlined in the preceding section. The results obtained appear in Table 1.

TABLE 1. VISCOSITY TEST RESULTS

Slab #	Seconds
1	7.6
2	12.0
3	8.9
4	7.0

As a fair uniformity among the several slabs was shown,

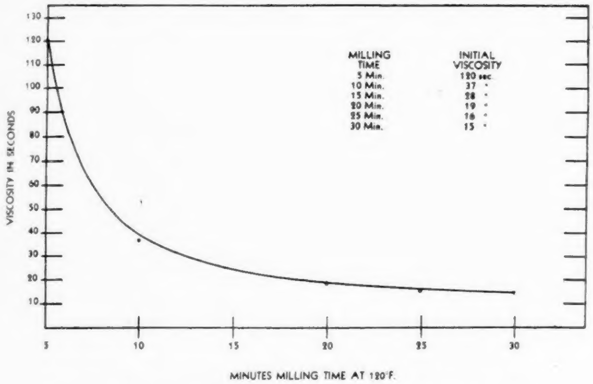


Fig. 1. Effect of Milling Time on Hycar OR-15 for Cements
15% Concentration in Chlorobenzene

it was next decided to test the uniformity of a single slab. Accordingly, a portion of slab #1 was cut into sections as shown in the diagram in Table 2. A 10% cement was prepared from each section, and the viscosity measured. Chlorobenzene was again used as the solvent.

TABLE 2

D	A	Top of Slab
	B	
	C	Bottom of Slab

Cross-Section Diagram of Portion of Slab #1 of Hycar OR-15

Test Results

Sample Section	Viscosity Seconds
A	7.4
B	7.4
C	8.2
D	7.4

B. STORAGE. The problem of storage is particularly important since storage of many synthetics used for cements, especially in hot locations, frequently affects the resulting products. Results of observations over a long period of time have shown that Hycar OR may be stored almost indefinitely at temperatures not exceeding 100° F. and still be useful for cement manufacture. During these observations, however, a quantity of Hycar OR-15 was found which had been in direct contact with a hot steam pipe. A cement made from this section gelled quickly on standing. Such situations should be avoided in selecting a storage location.

Processing for Cements

A. MILL MASTICATION AND BATCH WEIGHTS. Mastication or breakdown is the first step in processing any rubber before adding compounding ingredients. The operation may be achieved in internal mixers or on rubber mills. Only rubber mills have been found efficient enough to masticate Hycar OR for the manufacture of cements. Banbury mixing might be used after further experience is gained. The efficiency of the breakdown depends upon several factors, one of which is the batch size. If the total batch volume is too great, the bank does not roll properly, and the sheet around the roll is often too thick for efficient cooling. Experience has shown that a 60-inch mill can accommodate a total batch weight of 50 pounds; while an 84-inch mill will accommodate a 100-pound batch. These weights include synthetic plus compounding ingredients. Twelve-inch laboratory mills will effectively handle from 300 to 500 grams, depending upon the nature of the compound. Smaller batch sizes are recommended if channel black is to be added to the Hycar OR. In any case the compounding ingredients should not be added to the synthetic until it is adequately broken down. Mill rolls should be kept set as tightly as possible and still maintain a rolling bank.

B. CUTTING THE BATCH. Cutting back and forth during breakdown is one of those simple, but important steps necessary to the preparation of a good cement. During breakdown the sheet of Hycar OR on the mill roll should be cut and folded over from side to side during the entire breakdown period. This procedure insures complete blending and continual passage of the synthetic through the bite of the mill rolls. The effect and the importance of cutting during breakdown have been demonstrated by preparing 10% cements in chlorobenzene from samples of Hycar OR-15 which received different degrees of cutting. The results are shown in Table 3.

TABLE 3

Cutting Operation	Viscosity Seconds	Rapidity of Gelling
20-minute breakdown with no cutting	26	Gells in one day
20-minute breakdown cutting three times each way every five minutes	8	Gells in seven days
20-minute breakdown cutting three times each way every minute	8	Not gelled after ten days
20-minute breakdown cutting ten times each way every five minutes	8	Not gelled after ten days

In all future determinations in this study the Hycar OR-15 was cut ten times each way every five minutes to insure uniformity. In industrial or factory operations it is usually sufficient to specify that the Hycar OR should be cut *continuously* during the breakdown period.

C. MILLING TIME. The time necessary for adequate breakdown before the addition of compounding ingredients cannot be closely determined by plasticity measurements on the masticated Hycar OR. Initial breakdown of Hycar OR, as mentioned previously, has little effect on plasticity, but considerable effect on solubility as measured by the initial viscosity and by the stability of the resulting cement. For the manufacture of cements from Hycar OR an initial breakdown of from 15 to 30 minutes has been found desirable. This breakdown period is not excessive when one stops to consider that much longer periods are necessary for natural rubber in the preparation of certain types of rubber cements.

To show the effects of different periods of breakdown, a series of 15% cements in chlorobenzene was made from Hycar OR-15 samples masticated for different lengths of time at a milling temperature of 120° F. The resulting initial viscosities are shown in Figure 1.

D. MILLING TEMPERATURES. During milling, heat is generated very rapidly, and it is important that the rolls be cooled efficiently enough to maintain a temperature of 160° F. or less in the Hycar OR. High quality, stable cements have been manufactured from Hycar OR-15 masticated at 180° F., but substantial improvements can be made by maintaining lower temperatures. Low temperatures are frequently difficult to maintain on old rubber equipment, but are necessary for the production of good cements. Cutting down the batch size has been found helpful in maintaining low temperatures. Hycar OR-15 was milled at different temperatures, and viscosity and gelling determinations were made on the resulting cements. The optimum milling temperature was found to be 120 to 140° F. These data are shown in Figure 2.

Further to test the results of varying milling temperatures a special high-viscosity Hycar OR was used, and the cements were made up in concentrations of 20%. Of course

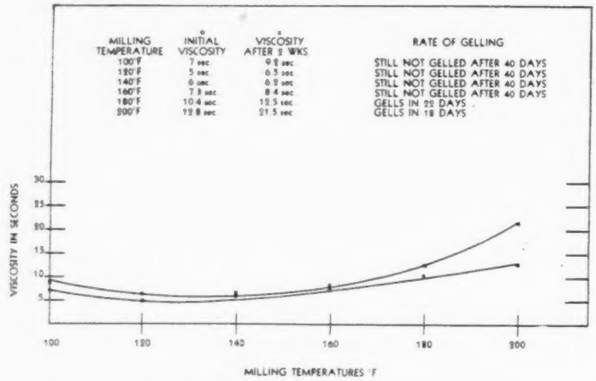


Fig. 2. Effect of Milling Temperatures on Cements from Hycar OR-15
10% Concentration in Chlorobenzene

the resulting cements would be impractical for commercial applications, but they serve further to confirm the optimum milling temperatures of from 120 to 140° F. Above 160° F. the higher the milling temperature, the greater the viscosity of the resulting cement, and the greater its tendency to gell. See Figure 3.

E. Effect of Time Lapse between Batching Stock and Mixing Cements. After the initial breakdown of the Hycar OR-15 the various compounding ingredients are added in their proper order, (see G under Compounding—*next installment*). After all ingredients have been incorporated and the batch has been blended thoroughly, it should be sheeted off in thin slabs, immersed in cold water, and immediately hung up to dry. After drying, the batch is ready for mixing into the solvent. In closely observing and studying the manufacture of many types of industrial cements it has been found that the sooner the batch stock is mixed into a cement, the more stable the resulting cement will be. A period of 24 hours between the batching of the stock and the mixing of the cement should be regarded as a maximum time lapse for high-quality, stable cements. If allowed to age longer than *eight* hours, a "warm up" mastication of from five to ten minutes before adding to the solvent will improve the quality of the resulting cement. The foregoing recommendations are made for the average cement from Hycar OR and might well be considered for improving cements made from other types of synthetic rubber. Occasionally a cement batch can be stabilized by compounding with stabilizing ingredients, and the critical aging period is thereby lengthened. Also the type of solvent used has a definite effect upon how long the batched stock may age. Such cases, however, are special ones, and the recommended short aging periods have been found generally effective in helping to insure a high-quality product.

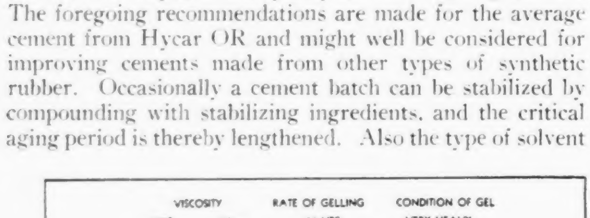


Fig. 3. Effect of Milling Temperatures on Cements from High-Viscosity Hycar OR
20% Concentration in Chlorobenzene

In Figure 4 viscosity and gelling determinations are shown which were made on Hycar OR-15 cements after different periods of aging between mill mixing and cement mixing.

F. Mixing the Cement. The batch stock is made into a cement by mixing with a solvent until a homogeneous mixture results. Several types of cement mixers can be used successfully for this process. Types of useful machines include the propeller or impeller mixer in which rotating blades provide the agitation, the "pony" churn in which eccentric paddles or blades knead and mix the components, and, finally, the simple arrangement of a can or barrel of proper size with a high-speed motor-driven propeller extending into it. The type of mixer is of secondary importance to the need of keeping the cement batch below 120° F. during the mixing process. The importance of using mixers in which the temperature can be regulated for making cements from Hycar OR as well as from other synthetic rubbers cannot be overemphasized. In the case

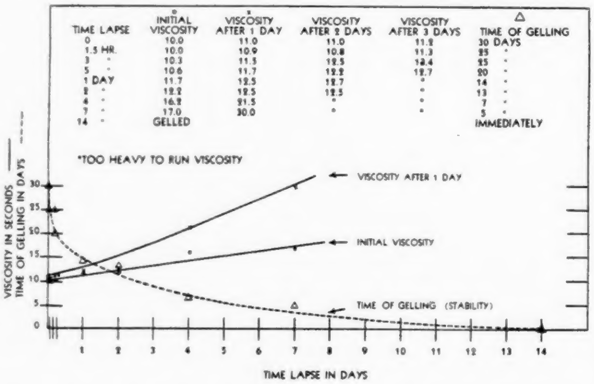


Fig. 4. Effect of Time Lapse Between Batching Stock and Mixing Cements from Hycar OR-15
10% Concentration in Chlorobenzene

of Hycar OR-15, if the temperature of mixing cements rises above 120° F., the resulting cement will usually be unstable and will probably gell on standing. There is practically no change in the initial viscosity of Hycar OR-15 cements mixed at any temperature in the range from 60 to 100° F. Above 120° F. instability of the resulting cement usually occurs. Solvent lost through evaporation during cement mixing should, of course, be replaced.

Assuming that temperature limits of between 60 and 100° F. are maintained and the solvent concentration maintained, it seems to make little or no difference how long the cement is stirred in the mixer. No improvement in the cement by stirring has been observed after complete solution has been achieved; therefore the cement may be "dumped" as soon as convenient after it is finished. Six cements were made under identical conditions except that they were stirred for different lengths of time, from ten minutes to one hour at 80° F., although complete solution was achieved in ten minutes. No differences in viscosity could be detected.

G. Concentration of Hycar OR Cements. The concentration of the cement will depend within limits upon its ultimate use. For the average brushing or dipping cement

(*Continued on page 261*)

Recent Russian Literature on Natural and Synthetic Rubber—I

M. Hoseh

THE problem of rubber from sources other than high yielding plants has arisen in the United States only recently. Other countries situated in this respect less fortunately than we were compelled to direct their attention to synthetic rubber long before the present world cataclysm. Among these the U.S.S.R. has accomplished a great deal, both in the cultivation of rubber bearing plants suitable for its climate and in research on synthesizing rubber. It is the aim of the present series of articles to bring to the attention of the American rubber technologist the work done in Russia as it is reflected in the technical and scientific literature of that country.

The series will be arranged in chronological order of the published papers and divided into more or less related topics; the respective papers are being presented as abstracts. It is outside the possibilities of this series to include all the material pertaining to synthetic rubber which has been published in the U.S.S.R. It is hoped, however, that the interested readers will find it sufficiently informative. For the purpose of this series the period from 1937 to date has been selected arbitrarily as the one that should provide the most recent and, we hope, the most interesting information.

For purposes of future reference all abstracts on the subject of synthetic rubber will be designated by the letter S and numbered consecutively S-1, S-2, etc., and all abstracts on natural rubber will be coded N and numbered N-1, N-2, etc., in a similar manner.

Making Chloroprene. A. Klebanskii, I. Dolgopol'skiĭ, and I. Chevychalova, *Kauchuk i Rezina*, 1937, 1, 31-34; 2, 19-27 (1937). **S-1.**

The method of Carothers for the production of chloroprene from HCl and monovinyl acetylene was tried. The reaction is catalyzed by Cu_2Cl_2 and NH_4Cl. The experiments were conducted in a revolving autoclave using a pressure of 1.5-2 atmospheres. Because of difficulties with the apparatus and in maintaining the required temperature, this method was abandoned, and two new ones were worked out. In the first method the monovinyl acetylene is dissolved in an organic solvent. For this purpose it is best to use xylene or kerosene. The concentration of the solute is 30-50%. A slight excess of 35-37% HCl is added to the solution. The reaction temperature is kept at 20-25° C. and its duration is one hour. The temperature and pressure are regulated easily if the catalyst is added gradually. The catalyst has the following composition: HCl (sp.gr., 1.19), 175 cubic centimeters; Cu_2Cl_2, 25 grams, and NH_4Cl, five grams. Under such conditions the yield of chloroprene is 75-80% of the theoretical value. The elimination of NH_4Cl from the catalyst did not lower the yield and indeed raised it to 88.8%. Substituting pyridine hydrochloride for NH_4Cl did not affect the yield (80%). However the reaction proceeded faster and at 25-30° C. was completed in 15 minutes. Lowering the excess of HCl to 0.7-mol does not affect the yield. Further lowering of the HCl excess lowers the yield of chloroprene.

The second method calls for lowering the pressure to 100-150 millimeters. By this method, while the catalyst is being added, the temperature is kept at —5 to —7° C. and is then allowed to rise to 20° C., where it is kept two hours. By this method the yield of chloroprene using freshly prepared catalyst is 85-90%. The optimum quantity of Cu_2Cl_2 was found to be 8-10%. The increased yield, when a regenerated catalyst is used, is explained by the fact that the catalyst loses its ability to combine into complexes with acetylene, a property which the fresh catalyst has. The reaction between monovinyl acetylene and HCl will take place when $CuCl_2$ is used, but the yield of chloroprene does not exceed 25-40%. The reaction product contains chloroprene, 80-88%; monovinyl acetylene which did not react, 3-5%; and a residue, 5-17%. The residue is made up of 2,4-dichlorobutene, dimers, and higher polymers of chloroprene. The most suitable material for plant equipment is iron lined with an acid-resistant enamel or with bakelite.

Synthesis and Properties of Divinyl and Vinylethyl Ethers. A. Gulyaeva and T. Dauguleva, *Kauchuk i Rezina*, 1, 49-52 (1937). **S-2.**

The divinyl ether is produced by the action of solid KOH on dichloroethyl ether at 220-250° C. in an atmosphere of ammonia and thereby splitting off HCl. The divinyl ether is a volatile liquid having a boiling point 28.0-28.50° C. and D^{20}_{4} 0.7721. When hydrogenated in the presence of Pt-black, it hydrolyzes to form $(CH_3CO)_2O$. Acted upon by weak acids, it forms acetaldehyde:

$$CH_2{:}CH{\cdot}O{\cdot}CH{:}CH_2 + H_2O \longrightarrow 2CH_3CHO.$$

Acetaldehyde is also formed when divinyl ether reacts with Cu_2Cl_2. A weak aqueous solution of SO_2 has the same effect. The divinyl ether combines with Br and maleic anhydride. In this latter combination it yields a rubber-like mass. With metallic Na it combines to Na acetylenide. Vinylethyl ether is formed from monoethyl ether of ethylene glycol. The OH of the latter is substituted by Br followed by splitting off HBr. The vinylate is a liquid, b.p., 34.5-35.5° C. and D^{20}_{4} 0.7609. In its reactions it closely resembles the divinylate.

The Synthesis of Methylallene and Its Properties. A. Gulyaeva and T. Dauguleva, *Kauchuk i Rezina*, 1, 53-56 (1937). **S-3.**

Methylallene (1,2 butadiene) was produced from crotyl alcohol, which in turn was separated from the butyl fraction of the waste from synthetic rubber plants. The reactions involved in obtaining methylallene follow:

$$\begin{array}{ccccccccc} CH_3 & & CH_3 & & CH_3 & & CH_3 & & CH_3 \\ CH & \xrightarrow{+Br_2} & CHBr & \xrightarrow{+PtBr_2} & CHBr & \xrightarrow{KOH} & CHBr & \xrightarrow{Zn} & CH \\ CH & & CHBr & & CHBr & & CBr & & C \\ CH_2OH & & CH_2OH & & CH_2Br & & CH_2 & & CH_2 \end{array}$$

Methylallene is a liquid, b.p., 10-10.5° C.[1] It forms a

tetrabromide, is resinified by H_2SO_4, and reacts with SO_2 to form a condensation product. Kept for a month at 60-70° C. it polymerized 2%, but at 175° C. it polymerized 41.4% within six hours. With maleic anhydride even after prolonged heating, it reacts only 0.66-3.40%. With metallic Na it reacts in the cold as follows:

$$3CH_3{\cdot}CH{:}C{:}CH_2+2Na$$
$$\rightarrow 2CH_3{\cdot}CH_2{\cdot}C{\vdots}CNa+CH_3{\cdot}CH{:}CH{\cdot}CH_3$$

Methylglycerol from Crotyl Alcohol of the Butyl Fraction. V. S. Batalin, E. V. Sekretareva, and N. N. Filippovskaya, *Kauchuk i Rezina*, 2, 28-35 (1937). **S-4.**

To prevent the loss of valuable material incurred when the butyl fraction is freed of crotyl alcohol by oxidation, a new method was developed. By this method crotyl alcohol is acted upon by HClO and thus converted to chlorhydrin, and the latter is saponified to methylglycerol. The butyl fraction with up to 20% of crotyl alcohol is treated with a 15-20% excess of a 2% solution of HClO for 1.5 hours at room temperature, thereby fixing 95% of the alcohol. Extending the time of or increasing the amount of HClO does not decrease the alcohol, but results in the formation of appreciable quantities of aldehyde. The chlorhydrin, of which 75% is dissolved in the aqueous layer and 25% in the alcoholic layer, is not separated, but directly transformed into methylglycerol. This is accomplished by treating it with a large excess of a normal hydroxide solution for four hours at 90-95° C. The whole is neutralized, and the butyl alcohol and water are distilled off. After being distilled off, the butyl alcohol is dried over potash. From the concentrated residue methylglycerol is extracted with ethyl alcohol. The yield of methylglycerol, is 50-60%. By careful washing, its chlorine content can be reduced to a minimum.

Reactions Involved in Synthesizing Vinyl Chloride from Acetylene and Hydrochloric Acid. S. Arutyunyan and S. Marutyan, *Kauchuk i Rezina*, 2, 35-44 (1937). **S-5.**

In the formation of vinyl chloride from acetylene and HCl a likely intermediate is $Cu_2Cl_2{\cdot}2HCl$. NH_4Cl apparently does not participate in the reaction since vinyl chloride can be formed in its absence. When Cu_2Cl_2 was replaced by Cu_2Br_2, no vinyl bromide was formed. This points to the fact that the reaction is catalyzed by Cu_2Cl_2 and not by Cu. It is quite likely that a triple complex $Cu_2Cl_2{\cdot}C_2H_2{\cdot}HCl$ is also formed during the reaction; it could not, however, be isolated. The passing of acetylene through aqueous solutions of various concentrations of Cu_2Cl_2, HCl and NH_4Cl showed that the utilization of acetylene increases with the concentration of Cu and HCl. Too high concentrations of the catalyst are not recommended, though, because of a decreased solubility. Raising the temperature shows a maximum in the formation of vinyl chloride at 80-90° C. Lengthening the time of contact results in an increased yield of vinyl chloride; there is no danger of polymerization or of resinification. The reaction most likely takes place at the liquid-gas interphase as evidenced by an increased yield of vinyl chloride when filling bodies were placed into the reaction vessel. Partly at least the effect of the filling bodies can be attributed to prolonging the duration of contact. The vinyl chloride can be absorbed in absolute alcohol. At 20° C. one volume of alcohol dissolves 52 volumes of vinyl chloride. Under laboratory conditions 80% of the acetylene is converted in one passing; this without forming noticeable quantities of extraneous admixtures. The production of vinyl chloride from powdered carbide is just as effective as its production from ethylene, besides being simpler.

Pyrolysis of Lower Olefins. Pyrolysis of Ethylene. S. Fershalov and A. Shcheglova, *Kauchuk i Rezina*, 4, 11-15 (1937). **S-6.**

Submitted to pyrolysis was the ethylene ethane fraction, obtained by fractionating the gaseous phase of naphtha pyrolysis with activated carbon. The pyrolyzed fraction had the following composition: C_2H_4 53.0-53.6, C_2H_6 21.8-22.2, CH_4 18.8-21.0, H_2 2.2-2.6, and air 1-2%. This fraction was preheated at 580-600° C.; then it entered the reaction chamber where a temperature of 720-800° C. was maintained. The reaction products were determined by condensation, distilling the condensate at 15° C., absorbing the volatile condensate with activated carbon, then absorbing the absorbed gases and analyzing them. When the contact period was extended from 0.5 to 11 seconds, the degree of decomposition of C_2H_4 and C_2H_6 and the yield of CH_4 and H_2 increased. The same is true for the yield of liquid products. The yield of dienes (divinyl) in relation to the quantity of ethylene (or $C_2H_4+C_2H_6$) passed through the reaction chamber attained a maximum at a contact time of two seconds. The yield of dienes with respect to decomposed gas decreased with time. An increase in temperature from 720 to 800° C. results in a more thorough decomposition; the degree of decomposition increases as do the yields of H_2 and of liquid polymers. The yield of dienes with respect to the treated C_2H_4 or $C_2H_4+C_2H_6$ increases but slightly; it increases with respect to the decomposed ethylene, but drops sharply with respect to the decomposed mixture $C_2H_4+C_2H_6$. The optimum yield of dienes at 780° C. and two seconds is 3.3% by weight of the treated and 23% of the decomposed ethylene. Recirculating the gases several times through the reactor with intermediate condensation gave the same results for each cycle; this regardless of the increasing dilution of the olefin. The total yield of dienes in five cycles attained 9.5%. Most effective proved a continuous uninterrupted cyclic process. In this process the amylene benzene and butylene butadiene fractions were removed, and fresh gas was added in the ratio of one part to 9-12 parts.

Rapid Method for the Determination of the Activity of Rectified Divinyl. E. Vtorova, *Kauchuk i Rezina*, 4, 107 (1937). **S-7.**

The samples to be tested are placed in 20-cubic centimeter glass tubes together with 0.5% of metallic Na. The tubes are either sealed or closed with Wood's alloy. The samples within the tubes are polymerized at approximately 60° C. The difference in activity of the samples is manifested in the velocity of their polymerization. The addition of 0.1% of methylallene, ethyl acetylene, or dimethyl acetylene prolongs polymerization four times and lowers the quality of the polymer.

Separation of Azeotropic Mixtures of Divinyl and Pseudobutylene. V. Dzevulskiĭ, *Kauchuk i Rezina*, 9, 8-10 (1937). **S-8.**

Divinyl and pseudobutylene form an azeotropic mixture containing divinyl 76.5% and pseudobutylene 23.5%. This mixture boils at 5.56° C. Discussed is the possibility of separating the components by cohobation, using pressures at which the composition of the azeotrope may differ from the composition at atmospheric pressure. In-

(*Continued on page 304*)

[1] "Handbook of Chemistry and Physics," 25th Edition, gives b.p. of methylallene as 19° C. EDITOR.

Rubber Research Laboratory

F. S. Malm[1]

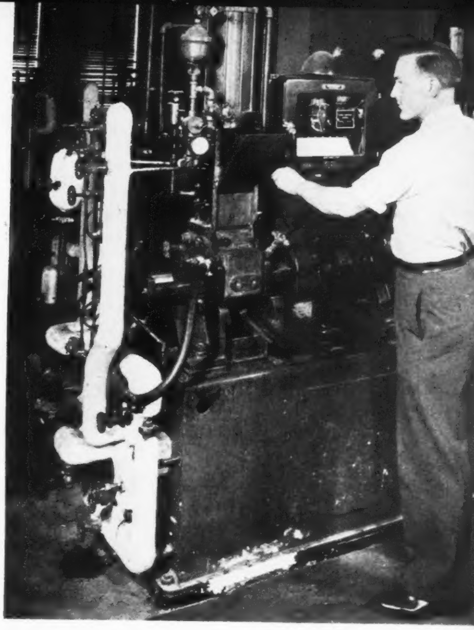


Fig. 1. Closed Type of Rubber Mixer

Rubber is used by the Bell System to insulate wires installed in the telephone plant in normal times by the millions of feet annually. It is also used for many other purposes, including various types of soft and hard rubber manufactured in molded form or cut from rods, tubes, or sheets for telephone apparatus. Much of this rubber is subjected to severe weathering and has to give long life under constantly changing conditions of temperature, humidity and light exposure.

The Laboratories have for many years been actively engaged in research on the chemical and physical properties of rubber and its compounds to determine the kind of materials required to withstand these severe conditions.[2] Most of the work has been directed to improving insulating materials made from plantation rubber, but an increasing part has been directed during recent years to synthetics such as Buna S and neoprene. This research work is being directed by A. R. Kemp, assisted by J. H. Ingmanson and the writer.

Extensive studies have been carried out on insulation for submarine cables leading to the development of Paragutta[3] and pressure-equalizing materials for loaded telegraph cables. Insulation has been developed for coaxial cables and more recently dielectric materials for ultra-high frequency and microwave cables. Rubber jackets were also devised to protect against corrosion the transcontinental cable laid between Omaha and Sacramento.

Recent loss of Far Eastern sources of supply of natural rubber has now forced an urgent problem on the rubber chemists of the laboratory, and their time is at present almost exclusively devoted to studying the properties and compositions of synthetic rubbers for immediate needs.

In the early part of 1942 the rubber group moved to the new laboratories at Murray Hill where complete facilities have been provided for studying rubber and its synthetic substitutes and for improving them. In anticipation of a peak load in this work additional equipment was installed including mixers, vulcanizers, and apparatus for physical and chemical tests. Conventional open-type mills with two rolls in which rubber is milled until plastic, preparatory to gradual incorporation of compounding ingredients by hand, and the closed type of mixers (Figure 1) in which blades instead of rolls are used to masticate the rubber until plastic, after which the compounding ingredients are fed into the mixer through a hopper and pressure is applied by a pneumatic ram during mixing, are essential parts of the equipment of the rubber laboratory. The internal mixer completes the operation in considerably less time and with greater cleanliness than on open rolls and conforms closely to good factory practice. Various compositions are prepared on these machines for making insulated wire, rods, tubes, sheets or molded parts.

All this rubber working equipment is provided with auxiliary apparatus for controlling and recording temperatures, pressures, and power consumption. The laboratory rooms are unique in that any of 15 different services including electric power, air pressure, vacuum, hot and cold water, hydrogen, oxygen and nitrogen in addition to illuminating gas are available at any bench or can easily be made so.

The extruding equipment shown in Figure 2 is used for making rods, tubes, and insulated wire. For these items

[1] Bell Telephone Laboratories, Inc., Murray Hill, N. J.
[2] *Bell Lab. Record*, Oct., 1936, p. 34.
[3] *Ibid.*, May, 1931, p. 412; India Rubber World, Mar. 1, 1931, p. 71.

Fig. 2. Covering Machines and Take-up for Applying Insulation to Wire

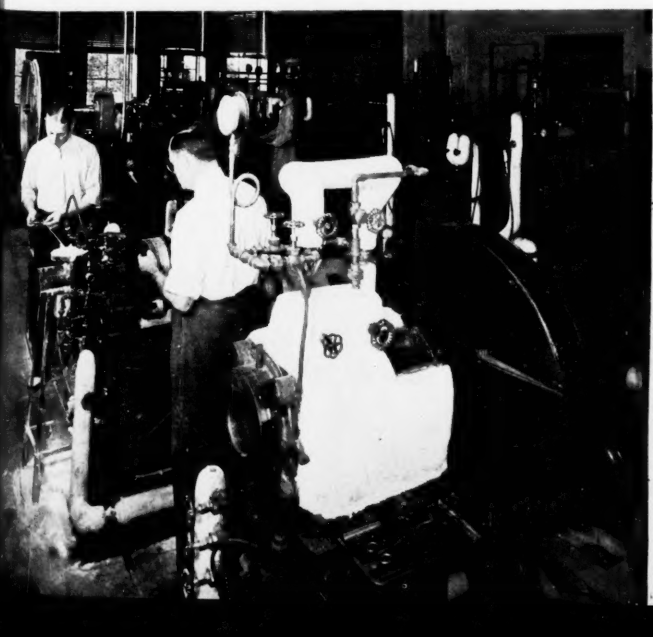
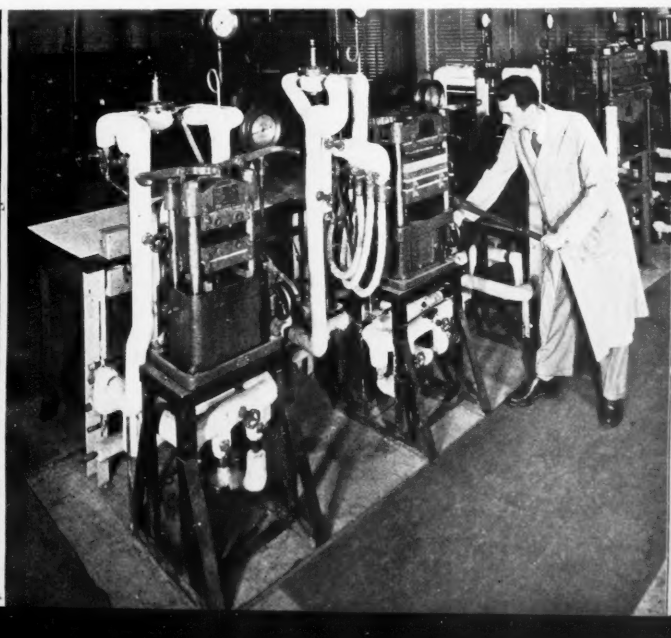


Fig. 3. Hydraulic Presses Used for Molding Rubber Parts



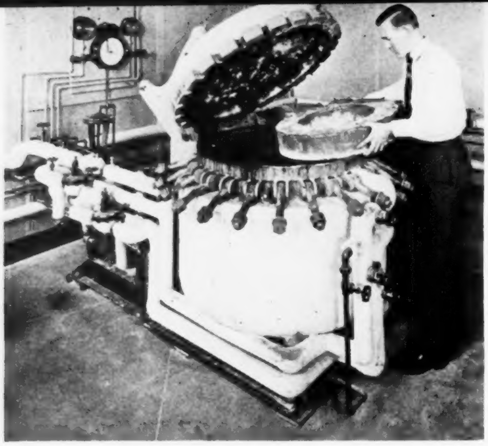


Fig. 4. Steam-heated Container Used for Vulcanizing Rubber

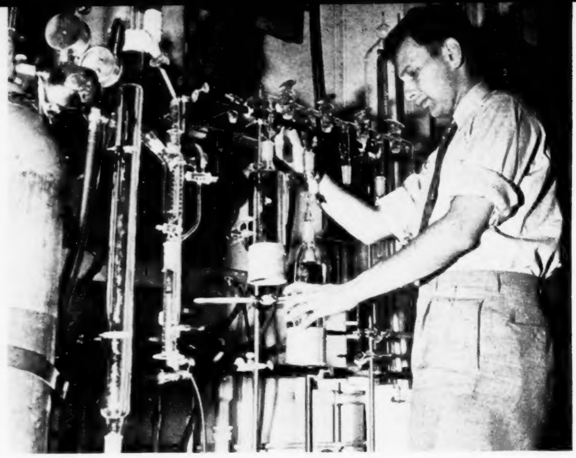


Fig. 5. Apparatus for Special Research on Rubber

the compound is plasticized on a mill and fed into the extruding machine, which is provided with a revolving screw for forcing the compound through sizing dies. These machines have water and steam connections so that materials can be run at different temperatures. When insulation is put on wire, a capstan is used to pull the wire through the sizing die. Two separate coverings can be applied simultaneously by using two machines in tandem. The extruders and capstan are driven independently so that varying screw and wire speeds can be obtained for the wide range of experimental work encountered.

A battery of five vulcanizing presses is shown in Figure 3. The four units to the left are used for the compression molding of finished parts. They are closed by rams and take conventional two-part molds filled by hand with sheet material. The last one to the right differs from the others in that it has a ram on top so that it can force blanks of compound into closed molds and thus effect savings in mold cost and time of molding.

Insulated wire and many other products are packed in soapstone and vulcanized in steam-heated equipment similar to that shown in Figure 4 or in high-speed continuous vulcanizers as in factory practice. Hard rubber is plated with tinfoil and placed into a water bath during vulcanization.

Vulcanization changes the rubber compositions from a plastic dough-like mass to soft or hard rubber, depending primarily on the amount of sulphur present. This transformation occurs as the result of heating appropriate compositions for different periods of time, depending upon the kind of product desired.

Some of the synthetic rubbers are similar to the natural rubber in that they can be vulcanized by the addition of sulphur and accelerators, and their physical properties improved by adding reenforcing pigments. Synthetics in general are not so workable as natural rubber, and for this reason modifying ingredients are necessary to obtain satisfactory processing properties. A view of a type of apparatus used in research pertinent to these problems is shown in Figure 5.

To improve the desirable characteristics of a rubber material and suppress the undesirable ones the rubber research organization endeavors to relate the physical characteristics of elastic materials to their molecular structure. Special apparatus is used in studying what happens to the rubber molecules when they are compounded, vulcanized, and destroyed through use. These studies on the mechanism of vulcanization, viscosity, molecular weight, and brittleness of rubber and allied substances are associated with current synthetic rubber problems.

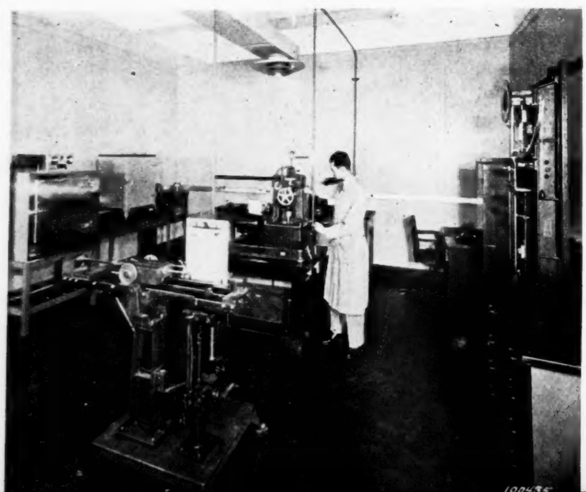
Equipment used for the general physical testing of rubber compounds is shown in Figure 6. These tests are made in an air conditioned room at 75° F. and 45% relative humidity to insure uniform testing conditions throughout the year. On the right wall is mounted a conventional 150-pound tensile machine with a compensating dynamometer head for testing dumbbell specimens stamped out from sheets. An inclined-plane tensile tester of ten-pound capacity which stands in the foreground is used for specimens of very small cross-section. Behind this apparatus is a compression machine, designed by the Laboratories for determining resistance of insulated wire to crushing loads and the shear resistance of sheet stocks. Along the left wall are two ovens. The nearer one is used for accelerated aging of rubber specimens, and the other for plasticity and scorch determinations of various compositions.

Considerable replacement of rubber insulated wire and other equipment is required annually by the Bell System on account of weathering. Studies of the weathering of

(Continued on page 258)

Fig. 7. Equipment for Artificial Weathering of Rubber and Other Insulating Materials

Fig. 6. Rubber Testing Laboratory



Fire Reduces Rubber Stockpile

Fire at a Massachusetts Rubber Plant Resulting in a Loss of $500,000

In First Year of War, Plants and Stock Depleted. . . . .

Leonard F. Maar[1]

FIRE struck many times at the rubber industry in the first year of war, damaging and destroying plants and burning up stocks of crude and used rubber that cannot be immediately replaced. The rubber shortage undoubtedly serves to focus more attention on these fires than they would receive in peacetime. There is no way of knowing at this time whether there were more or fewer rubber plant fires in this crucial year. That is not important. The fact is that any fire involving stocks or production of this vital material helps the enemy.

The National Fire Protection Association, in a drive to conserve all national resources, has listed about 300 fires that delayed or interfered with some phase of production in the year after Pearl Harbor. The list is far from complete. Here is a typical large-loss fire:

Maryland—Fire of unreported origin, starting in the center of the main section of the plant, completely destroyed this large, unsprinklered two-story brick-joist factory engaged in the manufacture of rubber and canvas footwear. Owing to the use of volatile solvents and the large open area of the main section of the plant, the fire was beyond control within a few minutes after being discovered by a watchman. The local volunteer fire department was unable to check the fire. Loss, $438,000.

If such fires occurred often, there would be no need for the enemy to send bombing planes over this country; sooner or later we would defeat ourselves. If that seems incredible, remember the Fall River fire, the most destructive industrial blaze in American history, in which some 14,000 tons of rubber were lost to the war effort.[2]

A number of special fire hazards exist in rubber plants, but, curiously, these were not the most frequent cause of the fires reported by the N.F.P.A. Careless smoking and use of matches appear most often as the cause of the fires in the year after Pearl Harbor. The following fall into this category:

Utah—Approximately 100 tons of scrap rubber were destroyed; fire believed due to careless smoking. The fire department found it necessary to move the entire pile of 400 tons of scrap rubber to extinguish the blaze completely. Recommendations of fire department as to size and height of piles were ignored.

New Jersey—Fire believed caused by careless smoking destroyed reclaimed rubber in storage yard of a rubber plant.

Ohio—Fire believed to have been started by boys playing with matches destroyed a quantity of rubber scrap in a storage yard.

It is significant in most of these fires that there are well-established contributory causes in addition to the original cause of the fire. In the Utah blaze the size and the height of the piles of rubber scrap made fire-fighting difficult and increased the amount of the loss.

Other fire causes, not at all identified with only the production of rubber, are found among the 1942 fires. The following are representative of this group:

Mississippi—Twenty-five thousand tires and about eight tons of crude rubber were destroyed when a spark from a grass fire ignited a rubber reclaiming building. Loss, $26,500.

Pennsylvania—Sparks from an acetylene torch resulted in a blaze which destroyed an ancient four-story wooden building with its contents, including a stock of scrap rubber valued at $30,000. Alarm was delayed. All records were destroyed.

There were also the usual number of fires in which the cause was not determined.

Iowa—Fire of unknown origin started in a tire retreading shop and entered the loft space. The one-story brick structure contained six occupancies separated by division walls which did not extend through the loft. Flames easily communicated to the other five shops. Loss, $26,495.

Texas—Fire of undetermined origin destroyed automobiles, tires, trucks, retreading machinery and tools, and about a ton and a half of camelback. Entire shop was in flames when fire fighters appeared on the scene. Loss, $75,000 to $100,000.

Philadelphia—Fire started in frame addition to boiler house and spread to scrap rubber pile in yard of rubber waste plant. High wind and dense smoke hampered firemen. Twenty-four hours later the fire broke out again. About 600 500-pound bales of scrap rubber were involved. Loss, "considerable."

Alabama—Between 30 and 40 tons of rubber and about 2,000 used tires were destroyed in a fire of unknown origin.

Pennsylvania—An unexplained explosion followed by fire occurred while all employes were eating their lunches outside the building. Plant was completely wrecked. Loss, $23,000.

[1] Safety Research Institute, Inc., 420 Lexington Ave., New York, N. Y.

[2] Salvage operations by which some of this rubber was recovered were described on page 493 of our February 1943 issue. Editor.

There were, of course, some fires chargeable against the special hazards of the industry.

Massachusetts—More than 1,500 tires were destroyed when fire started in the buffing room from a spark from retreading apparatus. Building and contents were heavily damaged. Flames spread rapidly owing to combustible wall and ceiling construction.

California—Fire caused by an overheated shaft on a buffing machine destroyed a tire retreading plant and supplies of new and used tires. Large quantities of buffing dust strewn over the floors contributed to the rapid spread of the fire. No sprinkler protection or fire extinguishers. Loss, $13,000.

Massachusetts—A small amount of scrap rubber in a burlap bag was placed in a drier. Burlap ignited, setting fire to finished footwear already in the drier. Plant was working on war orders. Automatic sprinklers opened, but could not reach the fire in the drier.

It is of interest to compare the causes of these fires with the average fire experience of the industry. The N.F.P.A., from a number of fires covering a period of years, compiled the following list showing the relative frequency of fires originating in the so-called special hazards of rubber plants:

Static sparks	23%
Flammable liquids	10
Drying ovens	8
Rubber dust	6
Spontaneous ignition	4
Vulcanizing	3
Friction	3
Miscellaneous	8
Total	65%*

* Balance of fires, or 35%, were the result of common fire hazards such as poor housekeeping, defective electrical installations, etc.

The safe practices established by experience and research in the industry will prevent such fires. The trouble starts when these safe practices are ignored. The quantity of volatile solvents used in many processes and the danger of igniting their vapors with static sparks or other sources of heat constitute the greatest dangers. Covering tanks of solvents as much as possible, forced ventilation of areas where explosive vapors may concentrate, and keeping only one day's supply of solvents in workrooms are standard practices in most plants.

The United States Office of Civilian Defense has outlined a general plan of fire safety that can be applied to any plant.[3] It begins by pointing out that early discovery of fire is essential to easy extinguishment. This principle is applied in many plants by placing considerable dependence upon the plant fire brigade, organized by departments to place trained men and suitable equipment in every part of the plant so that fire can be controlled in its early stages.

The first line of fire defense for the plant brigade is the standard fire extinguisher, of a type suitable for putting out the type of fire that may be anticipated in any section of the plant, and approved by the Underwriters' Laboratories or Factory Mutual Laboratories.

All employes, including watchmen and guards, should know how to use this equipment. A regular routine of inspection should be established to make certain all extinguishers are properly recharged and inspected. In this way the equipment will be always ready for use.

Other recommendations of the OCD plan follow:

Where automatic alarm equipment is provided, see that it is properly maintained and regularly tested and that alarm signals are understood and properly heeded by watchmen and others. Provide or arrange for suitable public and intraplant fire alarm services and for instruction of the proper persons in their use.

See that strict cleanliness, proper waste disposal and good order of occupancy are maintained.

Know through inspection and frequent reinspection the nature of the materials present, the operations to which they are exposed, and the special dangers of fire or conditions of fire arising out of the operations or storage.

See that proper control, insulation, and clearance are provided where fire heat of high temperatures are used. See that hazardous liquids, gases, or other dangerous materials are stored and handled in accordance with safe practice. Make certain that operations or storage involving marked danger of fire or of rapidly spreading fire or explosion are surrounded by suitable cutoff walls or other barriers.

Where private hydrants are provided, make sure that they are kept operative and accessible and are properly furnished with hose, properly threaded couplings, nozzles, washers, spanners, tools, ladders, hose reels, and other suitable equipment, ready at all times for use.

Inspect the entire plant once each week with respect to cleanliness, storage, and occupancy conditions, special fire hazards, provision and condition of first-aid fire extinguishing equipment, hose and hydrant equipment, sprinkler equipment, water supplies, valve sealing, watchman services, and all other features of fire protection, making operating tests where necessary to determine condition, and making written reports of inspections showing faults found and recommendations made. Cooperate in weekly or other plant inspections with executives, foremen, safety director, and others responsible for the operation and security of the plant. Cooperate with and take advantage of inspections by representatives of outside interests such as the public fire department and the fire protection engineers of the insurance interests.

This outline, when followed, will help management prevent many fires such as occurred in the first year of the war and to protect rubber plants against fires that do unavoidably occur.

[3] "Passive Protection for Industrial Plants", published by the U. S. Office of Civilian Defense, Washington, D. C.

Rubber Research Laboratory

(Continued from page 256)

rubber and rubber substitutes are therefore conducted in the laboratory to correlate outdoor observations with experiments where the weather can be artificially controlled. Figure 7 shows the interior of the photo-chemical laboratory where rubber and allied materials are subjected to artificial weathering. The two machines in the rear each enclose an arc light of high intensity which simulates sunlight. The samples tested are rotated around the light and subjected to a spray of water at intervals. The apparatus in the foreground comprises a cage-like structure and a sunlamp. The cage supports samples of insulating materials and rotates them around the lamp for exposure to the action of light only.

These new facilities for rubber research at Murray Hill come at a particularly fortunate time because the available supply of natural rubber is rapidly decreasing and many problems relating to the production of synthetics are not yet solved. They make available equipment required in this critical emergency to investigate and improve the rubber substitutes on which our military and civilian needs must now largely depend.

Cryptostegia Research in Haiti—II

Russ Symontowne[1]

Production Building *(Left)* Housing a Pilot Plant for Latex Coagulation, and Administrative Headquarters *(Right)* Gonaives Experiment Station

THE morphology and the physiology of the plant with reference to its latex system are also being investigated. The latex in the stems is borne in a separate laticiferous system of capillaries in the cortex and pith. The number of tubules varies in individual plants.

Investigation of Plant Characteristics

Gonaives[2] is also undertaking the investigation of the plant along genetic lines. The fact that there are many hybrid forms intermediate between the two species presents the possibility of combining the beneficial characteristics of the two species in clones.

Plants having a large number of T-whips of large cross-section are desirable since the T-whip is most suitable for tipping and since it has been established that latex flow is in part a function of cross-sectional area. T-whips of the same age vary from three millimeters to 6.5 millimeters in diameter, and the yield of rubber varies from three to 42 drops per T-whip at a single tipping.

C. grandiflora has the highest rubber content, and *C. madagascariensis*, the highest latex flow per unit of cross-sectional area. Besides *C. grandiflora* has a pronounced whip forming habit; while *C. madagascariensis* has the greater production of floral shoots.

It is proposed to take advantage of these variations to establish clones of high yield. Here *Cryptostegia* has a marked advantage over other commercial rubber plants because its rapid growth will permit the early establishment of clones.

An extensive program of grafting and budding are under way at Gonaives. To the great surprise of men accustomed to the difficult budding of *Hevea* which can be accomplished only when care is taken to prevent latex from coming between graft and patch, *Cryptostegia* is grafted and budded with entire ease. So far as is known, the first grafts of *Cryptostegia* were made at Gonaives.

Almost 100% success is obtained with every form of budding and grafting; firm union between scion and stock is established in about three days, and the scion grows as much as an inch and a half in six days. No care whatever is taken to prevent the flow of latex over the wound. In fact in the opinion of some workers the latex actually seems to promote the graft. So far as is known, *Cryptostegia* is the only rubber-bearing latex plant which can be grafted easily. Among the grafts successfully being made are: patch and insert budding; insert (or side) and cleft grafting on to stems; and insert (or side) grafting on to roots. It should be noted that failure attended efforts to obtain the practical rooting of cuttings.

The typical Gonaives graft is made as follows. The top of the stock is removed with a straight cut, and the bark is slit along one side so that the wedge-shaped scion containing one node may be inserted into the slit and held in place by several turns of sisal cord. Crown and root grafts are covered with soil, and above-ground grafts with waxed paper shields. It is noteworthy that grafting tape which was at first used has been abandoned because the growth was so rapid that damage was done by the tape to the shoots.

Crown and root grafts appear more desirable than stem grafts because there is thus no possibility of new growth appearing from the stock.

Research into the possibilities of seed breeding has just started. Various types of evidence indicate that the plant produces genetically pure lines very readily. Among this evidence is the fact that in Haiti and elsewhere, in Mexico and in Texas, aggregations of plants descended from single parents display marked uniformity. On the other hand the plants in the Gonaives escape valley, known to have come from seed borne by many ancestors, show a wide variation spectrum.

It is hoped to develop pure lines for certain characteristics which now appear desirable. Among these are: high latex yield, ease of latex flow, high rubber content of latex, high T-whip production, large T-whip diameter, and disease resistance. It is also hoped to attain races showing inter-strain hybrid vigor; some observations indicate that this phenomenon common in many plants is shared by *Cryptostegia*.

The pollinating mechanism of the plant is so complicated that the production of large quantities of seeds of a desired character may be very difficult. However the grafting procedures will enable plants showing desired characteristics to be propagated vegetatively. The natural pollinating agents—heretofore unknown—have been established at Gonaives to be two species of butterflies as yet unidentified.

The flowers, 50 to 70 millimeters in length and ranging from all-white (*C. grandiflora*) through mixtures of colors and shades to all-purple (*C. madagascariensis*) are so formed that only an insect with a long proboscis can reach

Four-Week-Old Side Grafts at Gonaives; the Stocks Are of Wild Plants Cut Back for Experimental Grafting, but not Transplanted

[1] Editorial staff, *New York Daily News*, 220 E. 42nd St., New York, N. Y. The *News* also kindly supplied the illustrations used in this article.

[2] The writer, from January 19 to March 13, was in Haiti studying the SHADA project. He made a number of visits to Gonaives and while there collaborated in the present paper with Dr. John Curtis, in charge of the staff.

the nectary. The butterfly's proboscis must enter a narrow passage at the base of the crown of filiform glands. This entrance cannot be accomplished without contact with the pollen laden, spoon-shaped translators, five in number, in a circular pattern, and coated with a gum-like substance which readily and securely attaches them to the proboscis. (Of course upon the insect's visit to the next flower, pollination occurs.)

The flower morphology is such that self-pollination is impossible, and likewise pollination by wind or by ants which occasionally invade the blossom.

In artificial pollination the pollen obtained on a needle tip from a given flower is transferred to the second through an opening made with a fine scalpel through the base of the corolla. Flowers thus pollinated have at this writing set, but whether they will produce mature seed has not yet been determined.

Natural pollination in experimental flowers is easily avoided by preventing the opening of the buds by encircling them with string.

After crossing, it will be possible to obtain seed within four months. Then, within six months, under favorable conditions there should be material for 100 grafts, and a high-yield clone in production should thus be possible within a year and a half from the time of crossing. This time interval may be contrasted with the period of many years required to establish, prove, and put into production a *Hevea* clone.

Coagulation and Sheeting

As stated, Gonaives seems to have solved with ease one major problem common to the production of all commercial rubbers: converting latex into commercial crude. It was many years before the present methods of preparation were developed for *Hevea*, and, in fact, the recent development of USF-rubber[3] is striking evidence that in this much-explored field there has been room for improvement. It might also be noted that the need of the improvement of the guayule extraction process is calling forth much experimental effort.

But *Cryptostegia* will make its entrance into the commercial rubber world with a well-nigh perfect method of crude preparation which makes use of tap water only for the coagulation of the latex. (Acids used to coagulate *Hevea* latex are ineffective with *Cryptostegia*, and ammonia, which stabilizes *Hevea*, coagulates *Cryptostegia*.)

When experiments were started at Gonaives, ethyl alcohol was used in preparing test sheets. It was not then known to the experimenters that for many years urchins in the nearby town of Gonaives had been making rubber balls by introducing latex and water through a hole bored into a coconut shell and shaking the mixture. The latex coagulated, and the ball was obtained by breaking open the shell. (A somewhat similar process of ball making has been reported from Mexico.)

A Gonaives technician, unaware of the boys' practice, made the water coagulation discovery independently and later developed the present process. He found that any relative water volume from one to ten produced a satisfactory coagulation; lesser amounts of water produced a somewhat more rapid coagulation.

Now in pilot-plant operation at Gonaives the following is the technique. Latex, purchased from farmers, arrives at the factory in every sort of receptacle, much of it having been gathered 24 hours and even longer before delivery. Bulked in buckets, it is then measured into a 2½-gallon shallow pan made by cutting a five-gallon gasoline can along its long axis. One liter of latex is poured into the pan, and six volumes, a practical optimum, of water added. Then the resultant mixture is stirred for a few moments, and froth and floating impurities are removed with a wooden skimmer. The mixture is left undisturbed 45 minutes, when it is found that the latex has formed a soft, "fish-belly white" coagulum about three inches thick. This soft cake is gently separated from the sides of the pan with a wooden knife and without being removed is manipulated momentarily to remove the larger entrapments of fluid and air. This reduces its thickness by about half. The coagulum is then lifted and fed into the first of a series of five standard hand-operated rolls, the last of which is a marking roll. The rolls are kept wet with water sprays.

From the marking roll the sheet emerges, glistening white and firm, yet soft in texture. The coagulum, while it is forming, is slightly photo-sensitive; grayish streaks appear on its surface unless it is shielded from the light while it remains in the pan. Once lifted from the pan, it seems to lose this light sensitivity. The water remaining is turbid, turning straw color upon exposure to light. It is believed that a large part of the latex resin remains with the serum in solution with the water.

The sheets have been both smoked and air-dried, and so far as Gonaives has yet been able to determine, no difference exists in the final product or its keeping characteristics regardless of treatment. It is likely that air drying will be adopted as a final procedure. Gradually, after being dried, the sheets take on the amber color and translucent appearance of light-smoked sheets.

Properties of the Rubber and Latex

The qualitative examination of the SHADA sheets by the Bureau of Standards shows that the rubber is substantially of the same quality as that produced by alcohol coagulation; the water coagulated samples in fact score a little better. Every determination of *Cryptostegia* rubber has shown it of high quality, comparing well with first-quality *Hevea*, and the SHADA samples are no exception.

The following analysis of a blend of alcohol and water coagulated sheets is taken from an unpublished report on *Cryptostegia* by Ernst A. Hauser.[4]

Acetone extract	8.83%
Acid in acetone extract (as oleic)	0.42
Ash	0.81
Nitrogen	0.71
Moisture	0.33

Prime ribbed sheet gave the following:

Acetone extract	3.66%
Acid (as oleic)	1.57

Dr. Hauser's report, in its conclusions, stated:

"*Cryptostegia* rubber shows a pronounced deficiency in fatty acids, compared to *Hevea*.

"*Cryptostegia* exhibits approximately the same rate of breakdown as plantation rubber (average of smoked sheet and Amber crepe).

"*Cryptostegia* rubber is very sensitive to deficiencies of fatty acids in compounds. To bring out the best qualities higher fatty acid contents are required in *Cryptostegia* compounds than normally used in *Hevea*. With increased purity of rubber this difference loses importance.

"To obtain optimum properties it is necessary to incorporate an antioxidant at the earliest possible moment.

"A normal amount of zinc oxide is essential for good properties in *Cryptostegia* compounds.

[3] India Rubber World, Sept., 1942, P. 582.
[4] The author is indebted to Ernst A. Hauser, Massachusetts Institute of Technology, Cambridge, Mass., for permission to make use of the analysis and the quoted material below.

"High acceleration or higher sulphur produces higher physical properties and a more rapid rate of cure.

"*Cryptostegia* is more sensitive to mill temperatures than *Hevea* rubber. A medium mill temperature results in optimum properties.

"The tensile strength of *Cryptostegia* tread stock is less than that of smoked sheet, but comparable to that of Amber blankets. The modulus is lower; elongation somewhat higher. *Cryptostegia* tread stock ages better than Amber crepe and is the equal to that of smoked sheet.

"The rebound efficiency is poorer than that of *Hevea*, but the heat build up is intermediate between smoked sheet (highest) and Amber blankets (lowest). There is no difference in blow-out resistance. The compression modulus is again intermediate. The abrasion of *Cryptostegia* tread is slightly lower than that of *Hevea*. The flex cracking of *Cryptostegia* is superior to that of *Hevea*.

"The incorporation of *Cryptostegia* into a GR-S tread type is definitely beneficial, and fully comparable to the use of *Hevea* rubber for the same purpose. The greatest reduction in running temperature was obtained with a compound containing equal parts of *Cryptostegia* and GR-S, and the proper amounts of fatty acid."

After commenting upon a lack of uniformity in the samples examined and pointing out that a majority of the results were based upon a limited sample, the report stated:

"In general *Cryptostegia* would be a very satisfactory substitute for *Hevea* rubber in regular stocks if the difference in the properties of *Cryptostegia* were kept in mind and the necessary adjustments made.

"It is safe to say that *Cryptostegia* could produce certain stocks equaling those made from *Hevea*, and in stocks where particular properties like high tensiles, high abrasion resistance, low heat build up, are looked for, at least 90% of the properties of first quality smoked sheet compounds can be realized."

Gonaives, hampered by the difficulties of building its plant and by delays in the arrival of some of the technical personnel and of laboratory equipment, has not been able to start all the investigations on its program. Among these is research into *C. grandiflora* latex characteristics. The latex appears unique in many of its behavior qualities.[5]

It is a fact confirmed by many chemists in the last few months that whenever the latex system of the plants is crushed so that latex and other plant secretions come into contact, the rubber precipitates upon the fiber, forming a union difficult to break with solvents. What connection, if any, this may have with the phenomenon of water coagulation is unknown. The latex has other peculiarities which may be related to these phenomena.

As pointed out above, latex exudes from the cut surface of the plant for about 12 minutes. In some individuals it fairly gushes forth, and in all it flows quite freely. Unquestionably, one of the factors controlling the cessation of flow is the falling of the plant pressure, but it is equally certain this is not the sole determinant. As the flow proceeds, a coagulum in the form of a cap or plug appears on the cut surface. Plants exhibiting the greatest pressures and greatest amounts of flow form the largest plugs. It is apparent that some phenomenon other than simple drying is present. It has been suggested by Dr. Curtis that water flowing from the severed xylem cells of the stem may bring about coagulation. However the phenomenon is an open question.

Some of the most surprising and puzzling phenomena are related to the remarkable keeping qualities of the latex. As before stated, the peasants bring latex to the experiment station in every sort of vessel, subject to every sort of contamination, yet rarely is the latex coagulated in any degree, nor does it exhibit any evidence of deterioration.

Latex has been left standing at Gonaives for as long as 30 days without separation, coagulation, or any gross manifestation of bacteria or fungi. Even in this desert atmosphere there was remarkably little thickening of the sample through drying. It has been suggested that the serum contains natural preservative elements not usually found in rubber latices.

The final form of the coagulation plant equipment has, of course, not yet been determined. That the plantation factory will make use of very large wooden vats is almost certain, and in Haiti, land of cheap labor, hand operation of the entire system will be no drawback to low-cost production. Experiments are now under way with vats designed to coagulate sheets in a vertical position, desirable if it will effect economies in vat size and water consumption.

The possibility of recovering useful products from the serum remaining in the coagulating vessels is about to be investigated. Mention has been made in earlier literature of the presence of drugs, among them, those of the digitalis series.

[5] Further investigations of the properties of this latex are now under way.

Synthetic Rubber Cements

(Continued from page 252)

a concentration of 10% by volume based on the Hycar OR in the recipe is recommended. This will average from one pound to 1½ pounds of compound per gallon of cement, or in terms of total solids will be from 15% to 20%. For a dough or spreading cement, concentrations of from 1½ to 2½ pounds per gallon should be adequate. The type of compound as well as the solvent used is, of course, a determining factor in the concentration of the cement. Unlike natural rubber, Hycar OR does not lend itself to highly concentrated cements. In the case of Hycar OR and many other synthetic rubber cements, the greater the concentration in any solvent, the greater the tendency to gell. There is little difference in viscosity between equal concentrations of Hycar OR-15 and Hycar OR-25.

H. Reversible and Irreversible Gels. The gelling phenomenon referred to in this discussion is believed to be a thixotropic effect and is not confined solely to cements from Hycar OR. It frequently occurs in cements made from natural rubber as well as from other synthetics, particularly if hard black is present in the compound. The gel is usually reversible, and the cement can be smoothed out again by rapid stirring. Cements which have gelled because all of the recommended processing practices could not be followed, and which have been smoothed out again by stirring, are satisfactory for use.

Irreversible gels cannot be broken by stirring alone and are usually caused in any rubber-type cement by prevulcanization or "scorching." Irreversible gels are generally formed in cements which contain ultra-accelerators or which have been stored too long before use. It stands to reason that a cement designed to cure at room temperature in a few hours cannot be stored indefinitely with accelerator added. For this reason fast accelerators are usually added shortly before use by dissolving them in the selected solvent and stirring into the cement.

(To be continued)

Progress Report No. 3 of Rubber Director

IN MAKING this, the third progress report of the rubber program, it is my desire at the very outset to state that the rubber problem has not yet been completely solved. It is a long way toward solution, and we are every day nearer to the time when we can put the construction of rubber plants, as a problem, behind us. But every American must realize that except for essential necessities, rubber cannot become a generally available commodity for a long time, and that extensive conservation of tires and of other rubber products must still be continued. In short, while the rubber program is not yet solved, it is in the best shape that it has ever been.

The next four to six months will be the critical period. Most of the synthetic plants will have been built and turned over to the operators who will be held strictly accountable for performance. Synthetic rubber is an intricate chemical compound. Many problems still must be solved, including the scheduling, production, and rationing of synthetic rubber; developing the techniques of using it; deciding in what products specific synthetics should be used; and deciding upon improvements necessary to fill the most pressing needs. This will require strenuous application on the part of highly trained technical staffs cooperating with rubber production men.

Capacity

The Baruch Committee[1] recommended a program of 1,037,000 long tons of rated capacity for the United States; additionally, plants were under construction in Canada having a rated capacity of 37,000 long tons, making a total program for the two nations of 1,074,000 tons.

Today, the program under construction in the United States and Canada has a rated capacity of 850,000 long tons, or 79% of the original recommendations of the Baruch Committee, and is divided among plants, many of which are made up of multiple units, as follows:

Product	Plants	Units	Tonnage Long Tons
Buna S	14	30	735,000
Butyl	3	5	75,000
Neoprene	1	4	40,000
Total Rubbers			850,000
Raw materials for Buna S:			Short Tons
Butadiene	23	32	688,500
Styrene	7	13	202,700
Total Plants	48	84	

In my last report[2] mention was made of several experimental pilot plants. One of these, using the so-called "Polish process"[3] of making butadiene from grain alcohol, has progressed far enough to warrant the construction of a 10,000-ton plant, which has been approved. Other pilot plants have not yet reached that stage.

Program Review

The Baruch Report recommended that "every aspect of the rubber problem must be under continuous review by a man whose sole responsibility it is." This has been done from month to month, and from day to day.

The rubber program is generally visualized as the construction of synthetic plants and the production of rubber only. Nothing could be further from fact.

It would be fatal to the whole program if we have an ample supply of rubber, but not enough of the many other constituents that go into manufactured products. My office has therefore the task of seeing to the proper flow to industry of a large number of chemicals, rubber substitutes, fabrics, such as rayon and cotton cords, etc.

Additionally, it is keeping track of the rubber industry's manufacturing and reclaiming equipment, and watching the many requirements for proper compounding such as carbon black, plasticizers, and extenders.

In these operations my staff naturally works closely with other branches of government in order to see that the whole rubber program is in balance, from production to final end-product.

Consideration has been given to the very difficult situation in critical plant components, and the need for them by other vital war programs; to the requirements for rubber of our armed forces, those of our Allies and of the essential civilian economy; to the possible production of some plants at rates somewhat greater than designed capacity; to the natural rubber supplies coming to us and to our Allies; to the ability of the manufacturing industry to consume; and to the ever-changing conditions arising from expanded and intensive research in and experience with synthetic rubbers by technical men within and outside of the rubber industry.

These considerations have influenced certain basic changes which have been made from time to time, and have resulted in reducing, through the following moves, the rated capacity of the program to its present scope.

1. Eight "refinery conversion" projects have been cancelled. It was originally thought that these could produce butadiene much more quickly than the Standard plants which were being built from the ground up. Due to a variety of causes, most of them unforeseen, this hope has not been realized, and their completion would be too late to be of material assistance. Therefore the critical materials were released to other projects.

2. Butyl and neoprene will not now be needed for military tires, and the need for iso-butylenes (used in Butyl) is critical in the aviation gasoline program. Therefore, 64,000 tons of Butyl and 20,000 tons of neoprene plant capacity have been cancelled.

3. Additional plant capacity originally recommended for the production of 109,800 short tons of butadiene; 33,600 short tons of styrene; and 140,000 long tons of copolymer (Buna S) have not yet been approved.

4. "Thiokol" N, which at the time of the Baruch Report appeared to offer an emergency source of tire recapping material, is not suitable for present conditions, and its use is limited to a few specialties. Therefore, the original program of 60,000 tons has been reduced to 24,900 tons.

5. The guayule program, operated by the Department of Agriculture, had progressed by the middle of March, 1943, to the point where 53,000 acres were under lease in California and the Southwest. Less than 1,000 tons of guayule rubber are to be produced in 1943. As originally conceived, the guayule program was to make use of marginal lands, but research indicated that the normal four-year production cycle could be cut to two, if the shrub were planted in irrigated lands. Thus, the Department of Agriculture concentrated on leasing irrigated lands.

In September, 1942, there was no general expectation that, by early 1943, a nation-wide food and manpower crisis would develop, and competition between food and guayule seemed irrelevant at that time. Conditions have changed. Food for 1943 has become more important to the nation than a rubber insurance policy for 1946 and beyond. As a result, I communicated with the Secretary of Agriculture, stating my views that no further critical food lands be leased for guayule production, but that I would continue to support a limited guayule rubber program on lands not now devoted to critical food crops.

6. While the most important phase of the rubber program is the production and use of synthetics, we have not overlooked the importance of natural rubbers as an integral part of the whole rubber problem.

I found that the development of the many wild rubber programs outside of this country was badly confused, and, as a result, the Reconstruction Finance Corp. organized Rubber Development Corp., on which I have placed full responsibility for quick and thorough development of all such programs.

a. The *Cryptostegia* plantations in Haiti are showing progress, and it is expected that some production will begin in early 1944. This rubber source shows promise and should give us some needed natural crude supplies, when the problem of proper extraction has been fully solved.

b. The Amazon Basin development in South America is being pushed with vigor and should bear some fruit in the near future. I sent a mission to this area in March, and it has returned with hopeful reports. It is a staggering program covering an area as large as the United States, in a country of low population density. The Rubber Development Corp. is working closely with the War, Navy, and State Departments and the Coordinator for Inter-American Affairs.

c. Every possible source of rubber in other Latin American countries has been examined, with areas in Mexico (for guayule and *Cryptostegia*), Colombia, and Ecuador showing the greatest promise. These countries are working closely with us in this important effort.

Progress of Synthetic Plant Construction

It is expected that all plants in the synthetic rubber program will be in operation before the end of the current year.

Construction is proceeding well. In addition to those plants (of both the synthetic rubber and high-octane gasoline programs) given special directives on December 8, 1942, and February 1, 1943, all the remaining plants of both the rubber and high-octane programs have now been integrated and scheduled, to the end that component parts flow smoothly to each program, and interfere as little as possible with other important parts of the war effort.

This, together with the basic scheduling

[1] INDIA RUBBER WORLD, Oct., 1942, pp. 57-58.
[2] *Ibid.*, Mar., 1943, pp. 576-81.

of critical components and providing of additional fabricating facilities, which is being carried out under the direction of Messrs. Wilson and Cordiner of the War Production Board, is breaking the heretofore disastrous bottlenecks that affected our, as well as other war programs.

At this time, of the 84 separate units making up the 48 plants in the program, 27 are in operation or ready for operation. These plants have a capacity of 252,000 long tons (30% of the program); while 14% of the butadiene and 18% of the styrene programs are in operation.

Balance Sheet of Rubber—1943

It is considered essential at all times to maintain a minimum inventory of 100,000 tons in the United States and Canada.

Because some savings have been possible against original requirements and because present estimates indicate a greater production of synthetic rubber in 1943 and a greater amount of natural crude rubber arriving from foreign countries than was indicated in my previous report of progress, the stockpile at the end of 1943 now is expected to be about 40,000 tons higher than previously estimated.

	1943 Long Tons
Inventory January 1	443,000
New supplies, crude and synthetic	308,000
	751,000
Requirements	609,000
Balance December 31, crude and synthetic	142,000

Supply

The stockpile of crude and synthetic rubber in the United States and Canada at January 1, 1943, was 443,000 long tons, compared with its high point of 660,000 long tons in June, 1942.

It is now estimated that new supplies for 1943 will be:

		Long Tons
Imports of natural crudes (plantation equivalent)		54,000
Buna S	218,000	
Buna N	17,000	
Butyl	11,000	
Neoprene	29,000	
	275,000	
Equal after conversion to crude equivalent		254,000
		308,000

Looking forward to 1944, all of the synthetic plants will be in production, providing over 750,000 long tons of crude equivalent. It is also expected that in 1944 at least 74,000 tons of new crude imports will be available to this country.

Production of synthetic rubbers in the first quarter of 1943 was 10,478 long tons, compared with estimates of 11,200 tons.

Requirements

Estimates of requirements for 1943 are not much different in total, from those shown in the Second Progress Report, but differ in amounts allotted to various agencies.

	Long Tons
Military	286,000
Trucks and buses	101,000
Passenger tires	35,000
Export, including British Empire	101,000
Canadian use—military, industrial, civilian	50,000
Other indirect military uses	36,000
	609,000

[3] *Ibid.*, Aug., 1942, p. 475; Apr., 1943, p. 60.

The Armed Services have cooperated splendidly in cutting to a minimum their use of rubber. As additional supplies become available, however, many uses now reduced or abandoned will be replaced.

It is not necessary to repeat the importance of maintaining a proper transportation system within this country. Due to increased burden upon all transportation facilities, the wear of bus and truck tires has been greater than anticipated, and allocations for this purpose have necessarily been increased.

The passenger-car tire problem is of such importance to 25,000,000 car owners in this country that a full explanation is provided below. Provision is being made for the production of 5,000,000 new tires in 1943 and 30,000,000 in 1944.

Passenger Car Tires

There has been much confusion as to policies in connection with passenger car tires. I want to make my position clear again.

1. It is my policy to reduce to the greatest extent possible the restrictions placed upon the American people where restrictions are not needed or are unnecessarily burdensome. Therefore it is no longer necessary to apply to ration boards for the recapping of tires.

Thanks to the splendid cooperation of the people and the fine work of those who organized the collection, the country now has a two-year supply of scrap rubber, enough to carry it to mid-1945, and additional supplies are becoming available every month. Recaps (camelback) are being made entirely from reclaimed scrap rubber, and no crude or synthetic rubber is used in them. However it is sincerely hoped that some way may be found in the near future to make available enough synthetic rubber to compound with reclaim for recaps. This would greatly improve their quality and length of service, thus making the use of fabrics and manpower in this field go further.

The most important and largest inventory of rubber in existence is in the tires of passenger cars. A recappable carcass is a net saving, because a new tire need not be issued. Too much regulation or too many difficulties make people run their tires too long, and the carcasses then are not recappable. They become a dead loss. Freeing recaps from rationing is a positive conservation measure which extends the life of the tires now on passenger cars. While some maldistribution in camelback for recapping of tires has occurred in certain parts of the country, this condition is being corrected as quickly as possible.

2. New tires will be issued only to essential drivers, that is, those drivers essential to the maintenance of production and distribution in the war effort and civilian economy. Upon the local ration boards is placed the responsibility of seeing that only essential drivers secure new tires, and that such new tires are issued only when existing ones are no longer usable or recappable.

3. By 1944 the country will have gone two years with less than one quarter of the normal replacement of tires and with no new cars. This accumulated deficit indicates that new tires must be provided in order to keep the country moving. Surveys show that 30,000,000 is the probable minimum replacement program that the country can get by with, even by general recapping, by maintenance of present driving speeds, and by keeping present conservation measures.

4. As passenger tire manufacture has been all but eliminated during the past two years, it is essential that industry train new personnel in 1943, as well as put tire-making machinery back into condition for production. Unless this is done this year, the industry will be in no position to take on a program of 50% to 60% of its pre-war volume, in addition to the vast production of other rubber products now being made for the war effort. Therefore it is necessary, if we are to be able to produce the minimum essential need of 30,000,000 tires in 1944, to fabricate at least 5,000,000 new tires in 1943. These, together with 7,000,000 pre-war tires now on hand, will be issued to essential drivers.

All of these steps are purely conservation measures and do not in any way imply that there is enough rubber to permit its use except when considered essential.

It cannot be denied that this country moves on rubber, and it is a military necessity to keep the country's transportation system alive. The non-essential driver cannot expect new tires for a long time, at least until rubber is no longer a critical problem, and every owner of a car must realize that conservation of tires must be strictly maintained. Driving speeds must be held down, non-essential driving reduced, and carelessness eliminated.

Rules and regulations are of little effect, if cooperation of the American people is not secured. To them, I appeal—it is their problem and theirs to help solve. Only by present-day cooperation will they provide themselves with speedier relief from the remaining burdens of rationing.

United Nations

With most of the large rubber producing areas in Axis hands, the United States is becoming the major source of supply for the United Nations.

Very close working arrangements have been effectuated with Great Britain and the Dominions in the distribution of natural and synthetic rubber supplies.

Through the Lend-Lease Administration and the Board of Economic Warfare, the needs of other of the United Nations are being cared for.

As previously reported, I sent a Mission to Russia in December, 1942. This Mission has now returned, and a technical Mission from Russia is now in this country. Mutual benefits should accrue.

Compounding of Synthetics

Passenger car and small-sized tires made entirely from Buna S have been built and tested with satisfactory results. However, among the principal requirements are heavy-duty truck, bus and combat tires, where as much as 30% natural crudes are still necessary.

Supplementing all of the tests that have been run by Army Ordnance, and others, over the past year to prove the use of synthetics in the place of crude, we are carrying on large-scale fleet tests in an endeavor to complete the solution of the problems incident to the use of synthetics in all tires.

Patent Rights

Until recently the situation incident to after-the-war ownership and licensing of patents dealing with the copolymerization of butadiene and styrene to make Buna S rubber has been confusing. As originally set up, it was hard to realize a true community of interest between those companies who had entered into a somewhat complicated arrangement of licensing and cross-licensing, and those who, because

they were on the outside, felt at a disadvantage. However, as a result of a recent voluntary offer of the Standard Oil Co. (New Jersey), followed by offers of similar tenure from three of the four rubber companies who are signatories to the present agreement, it now appears that we shall be able to look forward in the near future to a situation where all patents pertaining to the polymerization and manufacturing of Buna S will be interchangeable throughout their life to those who cooperate during the war in the furtherance of the rubber program and who join by making their own patents available to the other cooperators. It is expected that this arrangement will speed greatly the full interchange of information and the coming of the day when the quality of synthetics will surpass those of natural crude.

All such patents are royalty-free during the war, and I hope will be throughout the life of the patents.

Development

The staff organization of the Office of Rubber Director is cooperating with manufacturing organizations to make all technical information available to those who should have it. Emphasis is being placed upon the development of new knowledge which will help toward better operation of plants, greater uniformity of product, and better synthetic rubbers. In the final analysis, it is a question of improving the quality of Buna S to the point where it will be equal to or better in every respect than crude natural rubber.

Until this last objective has been attained, the use of synthetic rubbers involves (1) redesigning large-size heavy-duty tires to take care of the extra heat generated by the elongation and compression of synthetics; (2) using different types of carbon blacks than are used with natural crude rubbers; (3) increased milling in making certain rubbers ready for compounding; and (4) establishing new techniques incident to calendering, tubing, cementing, vulcanizing, etc., in the manufacture of rubber products. As a result, without waiting for expected improvements my organization is working closely with industry to solve these problems and to impart to all rubber manufacturers the best techniques.

Industry, large and small, is meeting, exchanging information, and dividing up the work that must be done. Selfish interests must be subordinated to the needs of the program. Great progress is being made and as more synthetics are made available for factory runs of typical products, the results of these efforts are showing encouraging results.

Present findings of the Army, based on results obtained with its test fleets, are that, because of the heat generating characteristics of Buna S, it will be necessary to use rayon instead of cotton cord in the carcasses of most large-size heavy-duty and combat tires. Many experts feel that this will also be necessary for large-size heavy-duty truck and bus tires.

In consequence of all the above, there has been or will be expansion (1) of the rayon tire cord producing facilities of the country, (2) of plants for the making of special carbon blacks, and (3) of certain rubber factory equipment. All of these are necessary corollaries to the synthetic rubber manufacturing program. These are receiving a great deal of attention, and it is hoped that they will be brought through in time.

Organization

Due to the efficiency of the entire staff working with me on this vast program, it has been possible to reduce personnel and to release office space.

It has been a source of satisfaction to see an organization of operating, technical, and construction men blend together and work so efficiently in so short a time.

W. M. Jeffers
Rubber Director

May 17, 1943.

Rubber Reserve Co. Circulars

No. 19 on Distribution of Rubber

(Supplementing and Amending Circular No. 17[1])

1. The second sentence of Paragraph 30, Page 8, Circular No. 17, is amended by eliminating the words ". . . executed in triplicate and delivered" and substituting in lieu thereof "delivered in triplicate."

It is only necessary to execute the PURCHASER'S ENDORSEMENT in cases where the services of a dealer are utilized by the purchaser. In no instance should the name of the Agent of Rubber Reserve Co. who will supply the material covered by the purchase permit be inserted in the PURCHASER'S ENDORSEMENT.

2. Sub-paragraphs 3 and 4 of Paragraph 3, Page 2, Circular No. 17, are hereby amended to provide that in all sales of synthetic rubber the bills of lading should be prepared by the Agent of Rubber Reserve Co. who will supply the material covered by the purchase permit; freight bill marked "to be prepaid" should be prepared and delivered to such Agents by the carriers.

3. In accordance with the provisions of sub-paragraph 2 of Paragraph 3, Page 2, Circular No. 17, should the purchaser elect to use a method of transportation other than rail, Rubber Reserve Co. will pay the established charges for the actual method of transportation used to the extent that such charges do not exceed the amount which Rubber Reserve Co. would have paid had the material been shipped by rail.

In a number of instances, purchasers have requested that the material covered by the purchase permit be shipped by truck or express, and it is expected that requests of this nature will continue to be made.

In cases where the amount of the truck or express charge on shipments of synthetic rubber is in excess of the amount of the rail rate, the carrier's invoice will reflect the amount of the transportation charges to be prepaid by Rubber Reserve Co. and the amount to be collected at destination from the consignee.

In connection with crude rubber, balata, guayule or liquid latex, if the purchaser or its dealer agent elects to use a method of transportation other than rail, the Distributing Agent or the Liquid Latex Agent, as the case may be, should be so notified and appropriate arrangements will be made by the Agent in connection therewith.

4. Paragraph 28, Page 7, Circular 17, specifies that only one purchase permit will be issued unless the amount of synthetic rubber allocated by the War Production Board is in excess of a carload lot (approximately 60,000 pounds). An exception to this procedure will be made in cases where the purchaser desires to have the material shipped to more than one manufacturing plant operated by such purchaser, provided the Sales Department of Rubber Reserve Co. is advised by telegraph to this effect immediately upon receipt of advice by the purchaser from the War Production Board of the amount allocated. In cases of this nature, separate purchase permits will be issued upon receipt of the purchaser's request.

5. Purchasers will be permitted to consolidate two or more permits covering the purchase of crude rubber, balata, guayule, synthetic rubber, or liquid latex, in order to effect shipments in carload lots, provided that with respect to synthetic rubber the material covered by the permits is to be supplied by the same Agent of Rubber Reserve Co., and insofar as crude rubber, balata, guayule or liquid latex is concerned, satisfactory arrangements are made with the Distributing Agent or the Liquid Latex Agent of Rubber Reserve Co. In cases of this nature, the purchaser will be charged the uniform freight charge applicable to less than carload shipments. Claims for refund on the basis of carload rates will be entertained, provided consolidations are effected.

6. Since minimum quantity requirements, upon which carload rates are based, are not uniform, Agents of Rubber Reserve Co., in determining whether or not purchasers should be charged the uniform freight charge applicable to carload lots, will be guided by the minimum quantity on which carload rates are based in the particular locality from which the crude rubber, balata, guayule, synthetic rubber or liquid latex is shipped.

April 30, 1943.

No. 20 on Selling Prices of Crude Rubber, Guayule, and Liquid Latex

(Amending Circular No. 17[1])

1. In view of the accounting difficulties with which manufacturers will be faced in purchasing rubber on the basis of the prices set forth in Circular No. 17, it has been decided that rubber will be sold in accordance with the amended procedure hereinafter prescribed.

2. Effective with all purchase permits issued on and after May 1, 1943, Rubber Reserve Co. will sell crude rubber, guayule and liquid latex to manufacturers on a

(Continued on page 284)

[1] India Rubber World, May, 1943, pp. 169-73.

EDITORIALS

Rubber Program Shows Definite Progress

ALTHOUGH the rubber problem is still a long way from being solved, Progress Report No. 3 by the Rubber Director includes many statements and figures to show that definite progress in the form of an appreciable tonnage of synthetic and natural is or will be produced during the next two years. In spite of the situation in September, 1942, when the Office of the Rubber Director was created and organized, it is reported that we have in operation or ready for operation, synthetic rubber plants with an annual capacity of 252,000 long tons of rubber. Since military requirements for the year 1943 are estimated as 286,000 long tons, it may be considered that our first and most important problem of having in operation within our borders sufficient synthetic rubber production capacity to supply the requirements of the Army and Navy has been taken care of in record time.

The problems and difficulties that have surrounded the rubber program during the last eight or nine months have been many and varied. Of considerable significance is the fact that despite this it cannot be justly said that the rubber program was forced ahead at the expense of real military needs and that it was not kept in a constant state of review in order that it should not get out of balance with other urgent war production problems. Cancellation of "refinery conversion" projects for butadiene when it was found that they could not be completed in time to be of material assistance, restriction of the guayule program when the need of the production of food on land leased for this natural rubber production became more important than the need for the production of rubber, and the organization of the Rubber Development Corp. in order that the wild rubber procurement program might be managed with maximum efficiency may be cited as evidence of sound judgment used in the execution of this program.

Further evidence that this program has been viewed in the right perspective and that definite progress in the over-all sense may be expected is the announced plan to provide 5,000,000 new passenger car tires in 1943 and 30,000,000 in 1944, these tires to be made mostly from synthetic rubber and to be allocated for essential civilian uses. In accordance with the recommendations of the original Baruch Report, our first problem was providing new rubber producing capacity for the Armed Services, after which and of almost equal importance was the problem of keeping the major portion of our 25,000,000 passenger cars moving since they represented the main means of transportation in this country and without them the great productive effort required for the war effort could not continue.

The important point that synthetic rubbers are sufficiently different from natural rubbers so that a large tonnage of these new rubbers would be of little value unless adequate knowledge was available regarding their processing has been kept definitely in the forefront from the first. As a result of this work, the processing of many types of products is quite well worked out. Where new materials are necessary for use with these new rubbers, they are being provided, and the expansion of the production of rayon tire cord and of reenforcing furnace black may be given as examples.

One of the problems of the rubber program has been the examination and repeated reexamination of the multitude of rubber compound formulas by the Office of the Rubber Director in order to reduce natural rubber consumption to the minimum, replace it as much as possible with reclaimed rubber, and now to revise the formulas to use synthetic rubbers. This job has been tremendous, but has been done and done well and has contributed a great deal to the fact that we have been able to maintain our stockpile as well as we have. Much credit should be given to the men who have done and are still doing this work.

The next four to six months are indicated as the most critical for the complete success of the program. Let us hope that these first evidences of real progress will be followed by further concrete results so that when the program is completed, although it may go down in history as one of the most difficult tasks of the home front during World War II, it will have been very well done.

The Achilles Heel Again

AS POINTED out in this column last October, the excellent work which is being done in this country on the problem of maintaining our supply of essential rubber products and which has now progressed to the point where synthetic rubber plants with a capacity of 252,000 long tons a year are now in successful operation will be nullified to a great extent if the productivity of labor in the rubber industry is not maintained.

The recent strike of rubber workers in the Akron area which required the intervention of the President in order to get these men back to their jobs was particularly significant since it occurred just at the time when real progress in all other phases of the rubber program could be seen for the first time. Actually these workers were doing more to harm than they were to help their cause. Governmental policy to date has placed greater restriction on management than it has on labor, but this is war, and because of the nature of the products of these particular plants, work stoppage cannot be tolerated. Bills before Congress at the present time have as their motive the setting up of machinery to make the enforcement of the "no strike" order more drastic and more direct. Production must and will be maintained, and it is up to the United Rubber Workers to decide whether this will be accomplished the easy or the hard way.

What the Rubber Chemists Are Doing

A. C. S. Rubber Division News

Synthetics before Chicago Group

THE Chicago Group, Division of Rubber Chemistry, A. C. S., met April 30 in the Morrison Hotel, Chicago, Ill., to hear H. A. Winkelmann, research director of the Dryden Rubber Co., discuss "A Comparison of the Synthetic Rubbers." Dr. Winkelmann spoke of our present synthetic rubbers as "expediences" for the duration, but predicted that after the war rubber technologists would have far superior types with which to work and types which would require far different methods of handling than those now in use. The speaker cautioned technologists to keep an "open mind" on the subject of natural rubbers and the synthetics so that they might more easily accept and utilize the new types which are being, and will be, developed in the near future. He then drew a general comparison of our present types: namely, natural rubber, GR-S, Perbunan, Hycar OR, the neoprenes, Butyl rubber, and the "Thiokols." This comparison was illustrated by slides and showed the advantages and limitations of each type.

After his talk, Dr. Winkelmann acted as master of ceremonies for a "question and answer" session. The board of experts consisted of C. S. Yoran (Wishnick-Tumpeer, Inc.), chairman of the Chicago Group; B. W. Hubbard (Ideal Roller & Mfg. Co.), secretary-treasurer; W. F. Bernstein (Victor Mfg. & Gasket Co.); H. Boxser (Western Felt Works); F. Frost (Frost Rubber Co.); J. Kirschner (Dryden Rubber); and A. H. Voss (Western Electric Co.). This team answered questions pertaining to the synthetics, which had been submitted by the membership.

The next meeting of the Group is scheduled for June 4 in the Morrison Hotel. The speaker will be G. A. Taylor, of Stanco Distributors, Inc., who will discuss the "Compounding and Processing of Butyl Rubber." As this will be the last regular meeting of the current year, the election of officers for 1943-44 will also take place.

Akron Group Elects

THE annual spring meeting of the Akron Group, Division of Rubber Chemistry, A. C. S., was held at the Akron City Club on April 30 with about 150 in attendance. Marion Miller's All-Girl Orchestra provided music and specialty dance numbers during the cocktail and dinner hours. Later Walter Grote mystified the audience with his feats of legerdemain.

A. C. Horrocks, speaking on "The New America", discussed the future as affected by men returning to civilian life from the army. These men have been great sales promoters; they will have established new trade routes because war routes are trade routes; they will have had up to $28,000 expended on their education; and they will come back ready to build and improve and make these United States a still greater nation.

The annual election of officers took place with the following results for the 1943-44 year: chairman, A. E. Sidnell, Seiberling Latex Co.; vice chairman, W. J. Krantz, Goodyear Tire & Rubber Co.; secretary-treasurer, E. W. Ballard, Midwest Rubber Reclaiming Co.

It is the will of the membership to dispense with the annual summer outing for the duration.

Los Angeles Group Meets

THE eighty-fifth meeting and dinner of the Los Angeles Group, Division of Rubber Chemistry, A. C. S., was held May 4 at the Mayfair Hotel, Los Angeles, Calif., and Chairman C. Roese introduced several guests, including Jack Britton, of Stanco Distributors, New York, N. Y.; E. K. Krueger, of King Plastic Co., Denver, Colo.; and D. Goddard, of Huntington Precision Products, Huntington, W. Va.

Following routine committee reports, the program chairman, Al Pichard, presented the speaker of the evening, Jack Little, pinch hitter for the ailing Don Thomas, managing director of the "All Year Club" of Southern California. His topic was "How a Playground Goes to War." The other feature of the meeting, secured by Arthur E. Wolff, of the New Jersey Zinc Sales Co., was the motion picture "Die-Casting," which showed some of the technical work being done by New Jersey Zinc.

The program concluded with the awarding of the door and raffle prizes. The door prize, a table lamp donated by Carl Stentz, of Latex Seamless Products, went to Curtis Wolter, of United States Rubber Co. The first raffle prize, a Hickok jewelry set, contributed by Harry Friedman, of Commercial Rubber Co., was won by C. A. Sickels, of Standard Rubber Co. War stamps, given by the Plastic Rubber Products Co., were won by Dick Banta ($3.75), Monty Montgomery ($5), and G. Smart ($10).

New York Group Program

THE following will be offered at the June 11 gathering of the New York Group, Division of Rubber Chemistry, A. C. S.: "KemPol: Its Qualities," by W. T. Walton, Sherwin-Williams Co., Chicago, Ill.; "The Present GR-I (Butyl) Rubber Situation," I. E. Lightbown, Standard Oil Development Co., New York, N. Y.; and "Some Observations on the Flex-Cracking Characteristics of Buna S Compounds," Joseph Breckley, Titanium Pigment Corp., New York. The meeting, scheduled to begin at 4:00 p. m. sharp, will take place at the Building Trades Club, 2 Park Ave., New York. Dinner is set for 6:30. Tickets for the latter, at $2 each, may be obtained from the Group secretary-treasurer, B. B. Wilson, care India Rubber World, 386 Fourth Ave., New York, N. Y.

Parrish Discusses Hycar

AT the April 29 meeting of the Northern California Rubber Group held at the Hotel Claremont, Berkeley, W. D. Parrish, technical service manager for the Hycar Chemical Co., first briefly outlined the development of the synthetic from its earliest stages down to the present and then presented an analysis of Hycar OS-10, OR-15 and OR-25. Following this talk the audience of 60 fired a great many questions which the speaker gladly answered.

The door prize, a $25 War Bond contributed by Hycar, was won by Douglas Anderson, laboratory technician at the Shell Development Co., Emeryville, Calif. Table favors, consisting of leather gas-ration book covers, were donated by Bob Abbott, of the C. P. Hall Co.

Mellon Institute Report

A RECENT annual report[1] of the activities of the Mellon Institute of Industrial Research, Pittsburgh, Pa., during the past year states that silence must be maintained during the war concerning the nature, scope, and results of many of the programs. However from this report some items of general interest to the rubber industry should be pointed out. The Institute's industrial research staff has been enlarged to 208 fellows and 187 fellowship assistants, an increase of 40 for the year. Of these fellowships, 17 are related wholly or in part to synthetic rubbers or rubber substitutes of diverse kinds, and 70 research staff members are carrying on this specific work. Among the new fellowships which began operation during the past year were a fellowship on synthetic rubber hygiene and one on chemical storage. A research bulletin on "The Storage of 1:3 Butadiene," has been issued by this latter fellowship. The multiple fellowship established under the auspices of the Cotton Research Foundation in 1937 completed its program during the past year. Much work on cotton tire cord was done under this fellowship. The Industrial Hygiene Foundation collaborating with the U. S. Public Health Service conducted a study to assist in reducing sick absenteeism in industry.

[1] *Chem. Eng. News*, A. C. S., Apr. 10, 1943, pp. 467-78.

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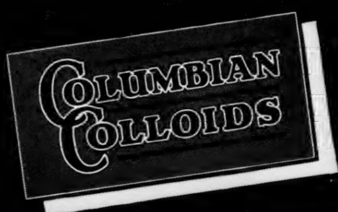

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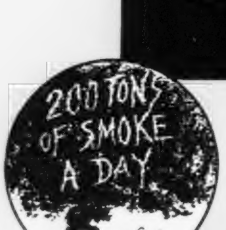

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Five Rules for Compounding GR-I (Butyl Rubber)

As the rubber industry is about to receive its first deliveries of GR-I (Butyl rubber) from the new government plant at Baton Rouge, the Office of the Rubber Director believes it important to emphasize once more certain rules for compounding GR-I which *must* be observed if satisfactory results are to be obtained.

Remember that GR-I is different than natural rubber. Compounders will have to forget certain processing "tricks" practiced for years to overcome various factory troubles with natural rubber stocks.

The rules for compounding Butyl are simple. They concern softeners more than anything else; in regard to pigmentation the compounder has almost as much leeway as he has in compounding natural rubber.

1. Unsaturated softeners must *not* be used. Do *not* use:

Pine tar	Cottonseed oil
Rosin	Brown factice
Rosin oil	Natural rubber
Cumar	Reclaimed rubber

Instead, use paraffinic hydrocarbons.

Use:

Petrolatum	Medium process oil
Paraffin	White oil

or, if resilience is also desired, paraffinic hydrocarbons such as:

Bayol D

or, chemical plasticizers of the types of aromatic ethers, halogenated aromatic ethers, halogenated aromatics, and aliphatic substituted aromatics:

P-Cymene	Chlorodiethyl benzene
Dibenzyl ether	Chlorinated diphenyls
Trichlordiphenyl ether	Dicyclohexyl adipate

2. Unsaturated fatty acids must *not* be used.

Do *not* use:

Palm oil	Lauric acid
Oleic acid	Cottonseed fatty acid

Instead, use fully saturated acids.

Use:

Stearic acid (some synthetic stearic acids are not suitable)

3. Do *not* try to improve processing properties such as rate of extrusion, calenderability, or building tack by additions of small amounts of natural rubber or reclaim. As little as 1% or 2% of natural rubber in a Butyl compound will cause a very poor cure.

Before mixing a Butyl compound on a mill or in a Banbury which has been used for natural rubber stocks, be sure the equipment is clean. Have the mill man clean out behind the guides; inspect the Banbury slide. A few pounds of natural rubber stock clinging to the back of the mill guides could ruin completely a subsequent Butyl batch.

4. Do *not* expect to obtain satisfactory cures with the amounts of accelerator normally used in natural rubber. The thiurams are the best of the conventional accelerators to use in Butyl and should be used to the extent of 1% on the rubber.

For information about faster non-sulphur types of cures, get in touch with the Office of the Rubber Director if you did not receive release 113.1 (November 5, 1942), entitled "Quick Cures for Butyl Rubber."

5. Remember that Butyl is much more impermeable to gases than natural rubber is. In building operations, if it is necessary to freshen surfaces, use solvent very sparingly and allow plenty of time to dry. Butyl has more natural building tack than any other synthetic, and in most cases you will not need additional tack. Therefore do not use *any* solvent if it can be avoided. April 26, 1943.

Carbon Black Sales Decline 30% in 1942[1]

The carbon black industry experienced reverses in 1942, according to data reported to the Bureau of Mines, United States Department of the Interior, Washington, D. C. Production was 3% below the record of 1941, and sales dropped 30%. Anticipating a rise in price, which occurred in January, 1942, consumers replenished their stocks at the end of 1941. Curtailments in exports and in rubber manufacture contributed toward a decrease in demand which was not offset by increased uses for military and for miscellaneous purposes.

Stocks held by producers at the end of 1942 were 242,755,000 pounds, the highest level since 1932, when 257,998,000 pounds were reported, and more than double the 118,847,000 pounds in stock at the end of 1941.

Natural gas burned in the manufacture of the 574,006,000 pounds of carbon black produced in 1942 amounted to 335,533,000,000 cubic feet, 8% less than was used in 1941. Carbon black producers paid an average of 1.29¢ a thousand cubic feet of gas in 1942, compared with 1.13 in 1941.

An increase in the manufacture of furnace blacks, which have a relatively high yield, caused a further gain in the total yield from 1.54 pounds per thousand cubic feet of gas in 1940 and 1.63 pounds in 1941 to 1.71 pounds in 1942. Furnace blacks comprised 24% of the total production of carbon black in 1942, 17 in 1941, 13 in 1940, and 11 in 1939.

Publication of export figures has been suspended. Total sales in 1942, including exports, were 449,931,000 pounds compared with 644,744,000 pounds in 1941 and 529,774,000 pounds in 1940. In spite of the slump in rubber manufacture, about 89% of domestic sales in 1942 went to the rubber trade. Toward the end of the year the demands from the synthetic rubber industry were taking up some of the slack. Deliveries to ink companies gained slightly from the standpoint of per cent. of total sales at the expense of sales to paint companies.

The average value at the plants of carbon black in 1942 was 3.41¢ a pound, contrasted with 3.26¢ in 1941. This is the highest average since 1937 when the same rate was recorded.

California and New Mexico were added to the list of producing states during the year.

Salient Statistics of Carbon Black Produced from Natural Gas in the U. S., 1941-2

		1941	1942
Number of producers reporting		21	21
Number of plants		49	50
Quantity produced:			
By states and districts:			
Louisiana	lbs.	78,050,000	90,353,000
Texas:			
Panhandle district	lbs.	415,001,000	380,536,000
Rest of State	lbs.	65,211,000	54,353,000
		480,212,000	434,889,000
Other States	lbs.	35,803,000	48,764,000
Total United States	lbs.	594,065,000	574,006,000
By processes:			
Contact processes	lbs.	492,857,000	438,603,000
Furnace processes	lbs.	101,208,000	135,403,000
Quantity sold:			
Domestic:			
To rubber companies	lbs.	439,502,000	295,947,000
To ink companies	lbs.	28,198,000	19,233,000
To paint companies	lbs.	5,840,000	3,616,000
For miscellaneous purposes	lbs.	*58,469,000	†131,135,000
Total	lbs.	*532,009,000	†449,931,000
Exports	lbs.	*112,735,000	†
Total sales	lbs.	644,744,000	449,931,000
Losses	lbs.	61,000	167,000
Stocks held by producers Dec. 31	lbs.	118,847,000	242,755,000
Value at plants of carbon black produced:			
Total		$19,341,000	$19,547,000
Average per pound	cts.	3.26	3.41
Estimated quantity of natural gas used	M cu.ft.	365,377,000	335,533,000
Average yield per M cu.ft.	lbs.	1.63	1.71
Average value per M cu.ft.	cts.	1.13	1.29

* Exports for Oct., Nov., and Dec. included with "Miscellaneous purposes" to avoid disclosing figures.

† Exports included with "Miscellaneous purposes" to avoid disclosing figures.

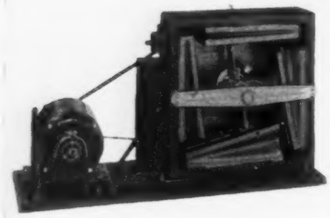
[1] Mineral Market Report No. MMS 1058. Prepared by H. Backus under the supervision of G. R. Hopkins, Petroleum Economics Division, Economics and Statistics Service.

Detroit Group Hears Temple

The spring meeting of the Detroit Rubber & Plastics Group, May 21, was featured by a talk on synthetic rubber by J. W. Temple, of the tire division of United States Rubber Co., assisted by W. H. Hulswit, of the same company. A brief picture of the supply situation emphasized that GR-S was now beginning to come into tire factories in million of pounds and would continue to increase in volume, but that notwithstanding, withdrawals for the balance of the year would result in a dangerously close approach to the minimum workable reserve before full GR-S production could relieve the situation early in 1944. The speaker then gave a short review of the chemistry of the principal synthetics and followed with a discussion of

(*Continued on page 278*)

New Machines and Appliances



Bellows-Type Vacuum Pump

New-Type Vacuum Pump

A POSITIVE-TYPE vacuum pump for production and laboratory applications comes in two standard sizes and is supplied with individual electric-motor drives, or without motors for use with an available power source. The pump employs four bellows mounted within a square wood frame, connected to each other and to the pump outlet by a channel running through the frame. Bellows, successively expanded to exhaust air or gas from the equipment to which the pump is connected, are driven by a relatively slow-speed shaft through connecting straps.

Flexible sides of the bellows are made of leather, as are intake and exhaust valves. All joints are gasketed by a sheet of neoprene cloth, and the frame or case has a black wrinkle finish.

The larger of the two units is rated at 15 cubic feet displacement at four inches of mercury. Bellows are six inches wide, and pumps individually driven use a ½ h.p. motor. The smaller unit, rated at seven cubic feet displacement at four inches of mercury, has four-inch bellows and uses a 1/6 h.p. motor. The pumps are equipped with governors to vary their capacities, and to prevent excessive wear on pump parts, the power transmission unit, or the motor when air or gas has been exhausted to the capacity of the pump.

The pump may be readily incorporated into the design of machines or equipment, providing advantages of quiet operation with low power requirements. American Automatic Typewriter Co.

New Wire Brushing Wheel

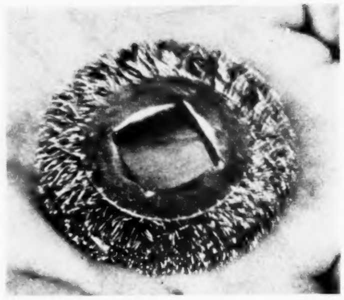
A TEDIOUS hand operation of removing rubber from end holes of tractor treads when metal and rubber are vulcanized together as part of the construction of General Sherman tanks, has been eliminated by the use of a new wire brushing wheel, recently devised and small enough to fit into the hole in the tread. The wheel uses 0.014 steel wire, which is coarse enough to remove the rubber, but not hard enough to mar the metal. This Ringlock section brushing wheel, as it is called, was designed for this one application, but it could be used similarly on other mechanical parts that will not be damaged by the wire. It will remove rust, weld scale, or burrs made by the boring of holes that intersect the hole being cleaned. A comparatively new development in brushing wheel manufacture, the wire in the Ringlock section is locked in by a one-piece ring and sleeve, which reduces breakage and creates a dense brushing surface. The Osborn Mfg. Co.

Deflect-O-Gauge

AN IMPORTANT development in the conservation of truck tires, a measuring device to determine the proper amount of air pressure to be carried in truck tires under varying conditions has been announced by The General Tire and Rubber Co., Akron, O. Known as the Deflect-O-Gauge, the device enables a truck operator to change the inflation in his tires to fit the conditions under which his truck is being driven. It is said to be the first instrument in the long history of the tire industry which accurately measures the amount of air needed, no matter what the load.

Deflected Reading Is Always Taken at the Bottom in Line with the Center of the Hub

Mot-O-Trol Drive Equipment and D.C. Motor



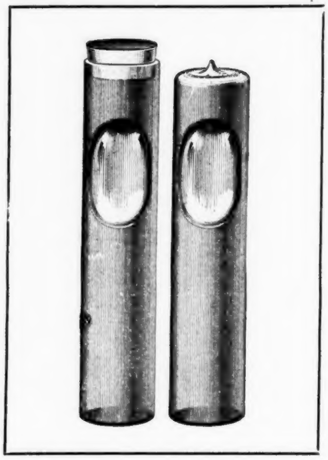
Brushing Wheel Aids Tank Production

Tires are engineered to deflect 12.8% under rated capacity loading. There is less wear on a tire with that deflection than with any other. If the deflection is greater the tire spreads out, the fabric sidewall ultimately breaks down, and the life of the tire is materially reduced. On the other hand if there is an underload and less deflection, the wearing surface is reduced, and the entire wear is concentrated on a small portion of the tread, thus causing extra wear on that portion of the tire contacting the road. Whether underload or overload, the device tells the trucker exactly how much air he needs to give his tire the proper 12.8% deflection.

A.C. Electronic Mot-O-Trol Drive

AN ADJUSTABLE-SPEED electronic motor drive has been developed that can be used in any industry on applications that require constant preset speed at varying loads over a 20-to-1 speed range and smooth, automatic acceleration and deceleration. This electronic motor drive, known as the Mot-O-Trol, was designed to fulfill the desired requirements of an A.C. adjustable-speed motor. Thyratron tubes supply a shunt-wound D.C. motor with rectified A.C. power. Smaller thyratron tubes used in the control provide rectified D.C. field current for the motor. The field voltage is held constant throughout the range of armature voltage and then is reduced to provide greater speed range by field weakening above the base speed of the motor.

The new drive has four parts: (1) a power transformer for separate mounting, (2) Mot-O-Trol cabinet with the thyratron tubes and the current limiting and speed regulating control, (3) control station with potentiometer to vary the voltage supplied to the armature and field circuits and with start and stop push buttons, and (4) shunt-wound D.C. motor. At present a standard drive is available for ratings up to one horsepower for single-phase operation on 110- or 220-volt, 60-cycle systems. Special drives of larger horsepower rating can be designed to suit particular application requirements. Westinghouse Electric & Mfg. Co.



Standard and Tube for Young-McArdle Viscometer

Young-McArdle Viscometer

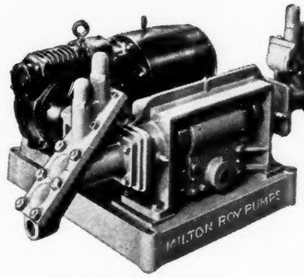
THE Young-McArdle viscometer is said to facilitate determining viscosities of polymer solutions and other liquids so viscous that they cannot conveniently be tested by other methods. This viscometer provides liquids of certified viscosity sealed in matched glass tubes 4½ inches by one inch, with empty, matched tubes for the samples to be tested. Viscosity is determined by inverting the tubes and comparing the rise of an air bubble in the sample with the rise of bubbles in the known standards. The air bubble in the heaviest standard requires about three minutes to rise. The procedure requires no special experience and is quicker than other methods. It should be useful for testing highly viscous rubber and synthetic resin solutions. R. P. Cargille.

New Air Speed Control

A NEW air speed control valve is said to provide and maintain accurate split-second timing of piston movements. It is also said that starting with full capacity flow in both directions, the flow in one direction can be controlled over a wide range to a completely closed position. A greatly increased range of selective speeds is obtained through a vernier-like adjustment mechanism. A specially designed stem and floating bevel seat poppet maintain a positive steady control at any selected speed. Ross Operating Valve Co.

New Pump for Synthetic Latices

A NEW opposed-end duplex pump designed to utilize the suction pressure present in the butadiene-styrene mixing vessel and pump against a greater pressure on the discharge end has been announced. This pump employs a step valve with double-ball checks, but is modified to enable latex (butadiene-styrene) to be handled with an absolute minimum of turbulence. The discharge checks are spring loaded to enable them to seat instantly and positively in handling material of this particular vis-



Milton Ray Duplex Pump

cosity. The pump has an accurate plunger-stroke adjustment by means of which the volume of latex delivered is precisely controlled, from maximum pump capacity down to as little as desired, even one quart per hour if necessary. This pump was first designed more than two years ago and has been constantly developed and improved. It is now used in both privately owned and government owned synthetic rubber plants. Similar step-valve pumps, in capacities up to 2,600 g.p.h., are being used to pump distillates, butane, glycol, and other petroleum products; to handle many processing chemicals and intermediates; also to pump against pressures as high as 20,000 pounds per square inch in high pressure synthesis. Milton Roy Pumps.

Money Loss Due to Boiler Scale

IN YEARS gone by other charts have been published about scale in boilers and its cost, but such charts were based on data available at the time. The accompanying chart is founded on a formula developed by W. F. Schaphorst, which, in turn, was based on a series of tests performed at the University of Illinois on tubes covered with scale of thicknesses varying from zero up to 1/16-inch. These tests revealed that heat losses vary from zero at zero thickness to 16% at a thickness of 1/16-inch.

To use this chart simply draw a straight line through the thickness of scale, column A, and the annual cost of fuel, column C, and the yearly loss due to scale will be found in column B. Thus if the scale of

New Ross Valve

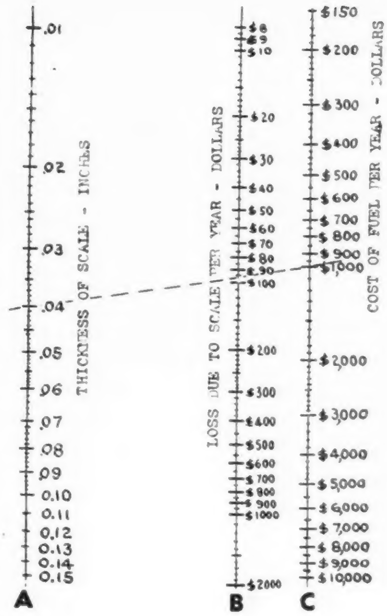


Chart to Calculate Loss Due to Boiler Scale

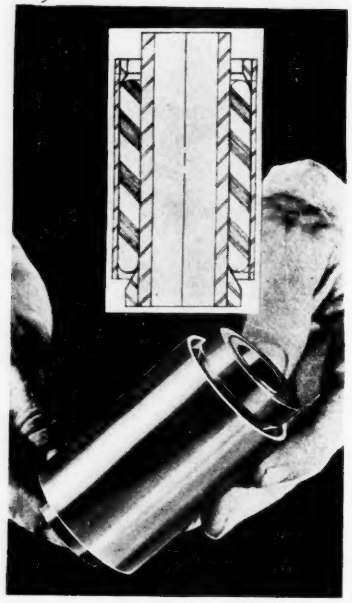
your boiler or boilers averages only 0.04-inch thick, column A, and you are spending $1,000 a year for fuel, column C, the annual loss due to the scale is approximately $96. The chart really has no limit, since if you add as many ciphers to the figures in column B as you add to the figures in column C, the chart can be applied to any expenditure for fuel.

To be sure, it is not claimed that the chart is "absolutely accurate." Such a chart would be well nigh impossible owing to the widely varying boiler conditions, scale conditions, and the varying scales themselves. Scales do not form in uniform thicknesses all over the heating surface of a boiler, and scales are different in composition in nearly every boiler. This chart, therefore, is designed to meet average conditions and for that reason was based on tests widely regarded as authentic.

An important point regarding scale, heretofore overlooked, should be emphasized. It was discovered while this chart was being developed. After a thick scale once forms on the boiler surface, a little added thickness or a considerably greater thickness does not make much difference in total fuel loss. The most important thing is to remove *all* scale from the surface of the boiler and then *keep it off*. Do not allow scale to accumulate at all because the *thin* scale is the most expensive. Fuel loss does not vary with the "square" of scale thickness, as was claimed years ago. Nor does it vary "directly" with scale thickness. It varies as the "square root" of the thickness. Therefore keep every bit of it out of your boilers.

New Goods and Specialties

C. J. Burkley, Who Perfected the New Non-Skid Military Tire *(Right)*, Which Appears next to a Bomber Tire of Conventional Construction before Insertion into the Mold



Rubberflex Engine Mount Support

Tire with Metal Inserts

THE Goodyear Tire & Rubber Co. has, as have several other rubber companies, developed a new type of airplane tire to prevent skidding on snow and ice. Feature of the carcass is the steel-wire spirals embedded into the tread of each tire to supplement the tread's non-skid function.

The wire coils first are strung on steel rods to be transferred in parallel rows to rubber mats, linked together with cement into a strip long enough to cover the surface of a customary airplane tire carcass. Then the latter is placed into a mold in the normal manner. By vulcanization the thousands of wire coils become an integral part of the diamond-design tread, which are scarcely noticeable when the tire leaves the mold.

The 1943 Official Baseball

Non-Rubber Center in Baseball

THE official baseball for both the National and American League teams this year will be substantially the same as the one used in pre-war years except for the center. Non-critical materials have been substituted for rubber, and the construction, as shown in the illustration, reveals an inside core of balata (reclaimed from old golf ball covers) and cork encased in two layers of balata compound plus a cushioning ring of the same material.

Some difficulties developed with the use of this ball due to the hardening of the cement made from substitute materials which was used between the layers of yarn just under the cover of the ball. The rebound and "liveliness" of the first balls were very poor. By use of a better cement this drawback was overcome and the corrected 1943 ball in use at the present time, which is the same in all respects except for a different cement between the layers of yarn, has about twice the rebound of the early 1943 ball and has been found to be completely satisfactory. A. G. Spalding & Bros.

Rubberflex Bushings

AN ENTIRELY new line of rubber insulated bushings recently was made available for general distribution in this country for the first time. Manufactured in a wide range of sizes, Rubberflex bushings employ a thinner layer of live rubber or synthetic rubber than commonly used. The bond between the rubber and the metal is mechanical rather than chemical and not only insures a slipproof bond for high torsional angles, but, of equal importance at this time, it also eliminates the pile of waste rubber that usually results from the assembly of conventional bushings, it is stated. The simplicity of manufacture that permits a wide range of sizes and capacities to suit individual requirements without costly tooling charges consists essentially of "shooting" the rubber bushing between an inner and outer metallic member. The rubber bushing is of greater O.D. than the outside cylinder and smaller than the inner cylinder. The bushings are expected to have wide use as engine mounts for aircraft, tractor and tank engines, marine and stationary engines, and even machine tools and similar equipment. The bushings may be used as insulating backing for ball, needle, babbitt, bronze, and "powder" bearings and may also be assembled for non-symmetrical parts, such as linkages and universal joint assemblies where convex and ball shaped parts must be insulated. The accompanying illustration shows a Rubberflex engine support mounting, and the sketch indicates how excessive loads merely increase the load on the rubber and can never cause the mounting to fail entirely. If the shear strength of the rubber is exceeded and the bond does slip, the mounting would merely change from an "insulated" to a "solid" type of support. Bushings, Inc.

UNITED STATES

Progress Report No. 3 Issued; Akron Workers Protest WLB Decision

Hearings on the rubber-aviation gasoline conflict before the Senate Committee Investigating the National Defense Program headed by Senator Harry S. Truman of Missouri were concluded on May 3 and 4 with the appearances of Under-Secretary of War Robert P. Patterson and Rubber Director William M. Jeffers. The Under-Secretary was in a less belligerent mood during his appearance before the Truman Committee than at the time of his outburst in April and revealed that through the efforts of a mutual friend not connected with the Administration, he and Mr. Jeffers had met and discussed their difficulties prior to his appearance before the Committee. As a result of this meeting, the Under-Secretary, the Rubber Director, and probably representatives from the offices of Vice Chairman Charles Wilson of the WPB and Petroleum Administrator Harold Ickes plan to visit various government gasoline and rubber plants to observe problems first-hand and try to break the bottleneck of the supply of critical components preventing the required rapid expansion of aviation gasoline as well as synthetic rubber. Mr. Patterson indicated that the need of more aviation gasoline was real, and although he knew that he could not expect new plants requiring 12 months to build to spring up over night, he was trying to make sure that everybody knew about the situation in the hope that within the next 12 months every effort would be made to help production catch up with the demand. He stated that he felt that the rubber program was in better shape than the aviation gasoline program, and therefore the emphasis should be shifted.

Rubber Director Jeffers in his appearance before the Truman Committee on May 4 stated that he had read Under-Secretary of War Patterson's statement of the day before and that he accepted it in the spirit that it was made. He stated that he felt that the testimony given before the Committee had brought out the fact the progress of the rubber program had not delayed the progress of the other four "must" programs, but in fact the momentum of the rubber program had aided the other programs, particularly with reference to providing greater production of critical components required for all the programs. Mr. Jeffers reviewed some of the recommendations of the Baruch Report to show that it was and always should be considered the most critical problem. He also, when interrogated regarding the present status of production and consumption of rubber, said that consumption now was actually somewhat less than that pictured in his Progress Report No. 2 of February and gave some new figures on the present rubber supply and demand to show that although the rubber problem was not completely solved, our chances looked somewhat better. He emphasized that the program was now reduced to its lowest safe minimum and the next four months would be the most critical. He pointed out that it was not possible to determine in advance the troubles that may develop from what is as yet an unproved process, or to say that there may not be accidents, fires, breakdown of equipment or machinery, labor difficulties, any of which could tie up a plant for months and again reduce our position to one of danger. He said that the "special directives" of December and January did not give rubber an overriding priority and that in many cases aviation gasoline plants and escort vessels got critical materials intended for rubber plants by virtue of his decision. He also made clear that liberalizing the distribution of recaps did mean that the rubber program was over the hump, since recaps, being made wholly of reclaimed rubber, were not a part of the major part of the program, that of crude and synthetic rubber. Col. Bradley Dewey, also present at this hearing, gave figures for the estimated production of synthetic rubber during 1943 and the reserve supply of rubber expected to be left on January 1, 1944, which figures were later given in Progress Report No. 3[1] on May 17. In conclusion Mr. Jeffers said he felt that frequent first-hand discussions between the heads of government agencies involved in war production problems under an overall authority would have been helpful all the way along.

The Truman Committee in an additional report issued on May 6, called "Concerning Conflicting War Programs", stated that the above-mentioned conflict was a result of basic weaknesses in the control of the war effort and said that the "lines of authority" were confusing even on paper. The Committee recommended that: "First, the strong over-all authority of the War Production Board must be made a living reality", and, "Second, without dilution of the power of the Chairman, the War Production Board should function as a board."

Office of Civilian Requirements Formed

Some concern was felt by the Rubber Director that the new Office of Civilian Requirements set up by Chairman Donald Nelson of the WPB might interfere if it was given power to allocate rubber for civilian uses. Mr. Nelson stated on May 4 that he had not contemplated making any change whatsoever in Mr. Jeffers' office or his operations and said that A. D. Whiteside, head of this new office, had as his duties in connection with rubber merely to review the arrangements made by Mr. Jeffers, and that Mr. Whiteside would have no voice in production. The Senate went even further than WPB Chairman Nelson in voting on May 10 a bill to create an independent Office of Civilian Supply separate from the WPB in opposition to both the WPB and the Truman Committee of the Senate. No action by the House has been reported on this subject.

Final Scrap Drive Figures

Jesse H. Jones, the Secretary of Commerce, revealed at the Petroleum Drive Luncheon held in Washington on May 5 that 2½ million dollars collected in connection with the scrap rubber drive last summer had been donated to the Red Cross, Army and Navy Relief Societies, and the USO. The final figures showed 867,000 tons of scrap rubber collected, of which 440,000 tons had been sold to the reclaimers to date.

Progress Report No. 3 Issued

In his third Progress Report issued on May 17, Rubber Director Jeffers took the position that the rubber problem was not completely solved and that except for essential uses, rubber could not become generally available for a long time. An appreciable number of synthetic rubber plants have been built and turned over to the operators, but many problems of production and use of synthetic rubber remained to be solved. Consumption somewhat less than anticipated and procurement of natural rubber as well as production of synthetic rubber somewhat better than anticipated permitted a reasonably hopeful outlook for the future, it was stated. Bringing the rubber program in balance with other important programs has caused the cancellation of eight "refinery conversion" projects for butadiene, resulted in the reduction of contemplated "Thiokol" N production from 60,000 to 24,900 tons, restricted the guayule program, and placed more emphasis

CALENDAR

June 4.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
June 9-10.	SAE War Materiel Meeting. Book Cadillac Hotel, Detroit, Mich.
June 11.	New York Rubber Group. Building Trade Employers Assn. Clubrooms, 2 Park Ave., New York, N. Y.
June 18.	Rhode Island Rubber Club. Summer Outing. Metacomet Golf Club, East Providence, R. I.
June 25.	Boston Rubber Group. Annual Outing. Commonwealth Country Club, Boston, Mass.
June 28-July 2.	A.S.T.M. Annual Meeting. Hotel William Penn, Pittsburgh, Pa.
Sept. 23-24.	SAE. National Tractor Meeting. Schroeder Hotel, Milwaukee, Wis.
Sept. 30-Oct. 3.	SAE. National Aircraft Engineering and Production Meeting. Biltmore Hotel, Los Angeles, Calif.
Oct. 5-7.	National Safety Council. 32nd National Safety Congress and Exposition. Chicago, Ill.

[1] See pages 262-64, this issue.

on wild rubber procurement, it was said.

Of the 84 units, making up 48 synthetic rubber plants in the program, 27 are in operation or ready for operation. A capacity of 252,000 long tons a year of synthetic rubber is available from these plants. The balance sheet of rubber revealed that about 40,000 tons more rubber are expected to be left in the stockpile at the beginning of 1944 than was estimated in February, 1943.

As a result of a survey of passenger car tires and their production, this latest progress report indicates that plans are being made for the production of 5,000,000 tires during 1943 and 30,000,000 tires in 1944 from synthetic rubber in order to maintain our 25,000,000 or more automobiles in operation. These tires are to be for essential users only, and the plan is classed a conservation measure to keep the country moving, it was said.

Development work in connection with the use of Buna S rubber has been or will be the cause of expansion of rayon tire cord producing facilities, plants for making special carbon blacks, and certain rubber factory equipment, was reported in conclusion.

Inspection of Synthetic Rubber Plants

Reports by Russ Symontowne in *The New York Daily News* on May 17 and later dates on a copolymer plant, a butadiene plant, a styrene plant, and a Butyl rubber plant, all in the South and Southwest, provided a very general eye-witness account of the size and operation of these plants. Inspection of the Institute, W. Va., butadiene and copolymer plants was scheduled by representatives of the newspapers, technical, and trade journals for late in May and another inspection of these same plants will be made by Rubber Director Jeffers and many other government officials and interested parties on June 11. A celebration will be held on June 28 in Houston, Texas, in connection with the opening of a synthetic rubber plant in that vicinity to be operated by the General Tire & Rubber Co. and its associates. Secretary of Commerce Jones and Rubber Director Jeffers are among the many officials that have been invited to take part in the ceremonies.

Rubber Workers Protest WLB Wage Increase Decision

Members of the United Rubber Workers Union (CIO) in the plants of The B. F. Goodrich Co., Goodyear Tire & Rubber Co., and the Firestone Tire & Rubber Co., all of Akron, O., went on strike starting May 22, in protest of the War Labor Board's decision to grant a 3¢ an hour raise in pay for workers in the Big Four rubber plants instead of the 8¢ an hour increase asked for by the union. It was indicated that the increase was 5¢ under the maximum permissible by the "Little Steel" wage formula to grant increases to compensate for rising costs of living. Eight plants of the United States Rubber Co., located in various other parts of the country were also affected by the decision, but at this writing (May 24) they had not joined the strike. Most of the workers of the General Tire & Rubber Co., in Akron who walked out in sympathy with the workers in the other plants returned to work on May 24. It was indicated that the Akron strike was a "spontaneous local demonstration," and it was condemned by Sherman S. Dalrymple, international president of the union.

The B. F. Goodrich Co., in a statement issued on May 22 said, "Every man-hour lost affects our production for the war effort. Over 100,000 man-hours of war production are involved in each 24-hour day."

The requests for wage increases all originated about a year ago, and the last request, that of the Goodyear Tire & Rubber Co., was certified to the War Labor Board last September.

The WLB referred the strike to President Roosevelt on May 26. As Commander-in-Chief of the Army and Navy, he ordered the strikers to return to work by noon May 27, or the government would take necessary action. Full shifts were back the afternoon of May 27.

Kok-Saghyz Development

Experiments in growing *kok-saghyz* are being conducted on the Bureau of Reclamation's Klamath project (Oregon-California), Secretary of the Interior Harold L. Ickes announced May 21. The Emergency Rubber Project under the United States Forest Service now is devoting about 20 acres of government owned land there to the Russian dandelion, Harry W. Bashore, acting commissioner of the Bureau of Reclamation, informed Secretary Ickes. A five-acre tract on the adjacent Experimental Farm also has been seeded, and 35 acres more have been leased from farmers of the Lower Klamath Drainage District.

The main objective of this year's planting of *kok-saghyz*, Mr. Bashore said, is to secure seed, although a small portion of the crop may be harvested and subjected to experimental processing for the extraction of rubber. The experiment on the Klamath development is a continuation of tests started in this country last summer with a shipment of seed received direct from Russia by plane. The Soviet Union is reported to have planted about 2,000,000 acres of *kok-saghyz* for rubber in 1942.

Last year a trial plot of about 2,000 square feet of Russian dandelion on the Experimental Farm of the Klamath project produced at a rate of 50 pounds of rubber per acre. The advantage of this plant over other rubber-producing plants is that it can be harvested and processed in a single year. The Russian dandelion is similar to the American variety except its rubber content, found in the tubes of the roots, has been increased through breeding and selection. It is less hardy than the American variety, requiring intensive culture.

Board of Economic Warfare, Office of Exports, Washington, D. C., in Current Export Bulletin No. 95, May 3, states, "Effective May 15, 1943, all license applications covering the exportation of certain rubber goods, Schedule B Nos. 2014.00 through 2099.90, must show the actual content in pounds of crude, reclaimed, and synthetic rubber in the commodities to be exported."

United States Department of Commerce, National Bureau of Standards, Washington, D. C., is releasing to the producers, distributers, and users of automobile and truck tires "Commercial Standard for Treading Automobile and Truck Tires, CS108-43," which is now a recorded standard of the industry, effective for new production from June 10, 1943.

Bill Brothers Employes Included among Donors to the Red Cross Blood Bank

Members of the staff of INDIA RUBBER WORLD and of the other Bill Brothers publications have given their blood to the Red Cross blood bank in order that those who are fighting for us have a better chance of coming back. This picture is published with the hope that it may inspire ***you*** to organize a group in your office or plant to give its blood. It is vitally necessary to save the lives of many of those who are truly doing the ***real*** job for all of us. E. L. BILL, Publisher

Rubber Products Price Orders Revised; Additional OPA Information

Temporary MPR 31—Federal Government Purchases of New Rubber Tires and Tubes—freezes from May 1 to July 1 prices for new rubber automotive vehicle and airplane tires and inner tubes when bought by government agencies, except the War and Navy Departments and the Defense Supplies Corp., at present list prices of the Treasury Procurement Division as ceilings for such purchases. At the proper date the OPA will issue a permanent price regulation that will reflect increased costs resulting from the higher prices for crude and synthetic rubber for military use effective April 1. Amendment 5 to MPR 143—Wholesale Prices for New Rubber Tires and Tubes—and Amendment 10 to RPS 63—Retail Prices for New Rubber Tires and Tubes—exclude such sales from their coverage.

Amendment 1 to MPR 31, issued May 17, maintains, however, a maximum price for sales of size 6.50-20 tubes.

Amendment 3, RPS 82—Wire, Cable and Cable Accessories—effective May 8, allows producers of rubber-covered wire and cable to quote higher than ceiling prices to reflect cost increases resulting from the crude rubber price increase that went into effect April 1. But prices in excess of ceilings at the time of delivery are not permitted.

Amendment 7, MPR 200—Rubber Heels, Rubber Heels Attached and Attaching of Rubber Heels—extends to June 20 the deadline for producers of segment fiber heels to complete tests in accordance with quality standards under which the heels were to have been classified after May 20. Until June 20 the heels continue to be classified and priced in relation to the minimum physical specification of their nonfiber portion. The amendment also clarifies the distinction between corded and fiber heels, specifying that the former must contain clearly discernible whole cords which lie parallel to each other at a given level; also specified is that only the fiber portion of fiber heels must meet the abrasion test.

Amendment 7, MPR 220—Certain Rubber Commodities—effective May 8, removes from the General Maximum Price Regulation and includes under MPR 220 canvas and other fabric topped footwear with substitute rubber soles. Previously it was necessary for producers to obtain OPA authorization each time the ceiling of a type of fabric topped footwear was established; now, however, manufacturers need merely apply the method provided in the particular regulation for such commodities. OPA said that for some time such footwear with rubber soles was not made for civilians because of WPB restrictions, but recently new types of footwear with substitute rubber[1] soles have come on the market.

Amendment 8 to 220, effective May 13, excludes from GMPR and includes under 220 the following sanitary treated baby items: baby bibs and pants, crib sheets, diaper and utility bags, diaper covers, lap pads, mattress covers and coveralls, nursery seat rings, pillow cases, and place mats. As the constant changes in the composition of these baby products, due to the shortage of materials caused by the war, made their pricing difficult under GMPR, surveys by the OPA and conferences with the industry led to the switch of regulations so that industry practices and customary margins could be preserved. Pricing methods for both wholesale and retail ceilings with two bases indicated, one for sales east of the Rocky Mountains, the other west, are given, also for mail-order house sales.

To reflect the 45¢-a-pound price of GR-M (Neoprene GN) that went into effect April 1 the OPA, effective May 12, in Amendment 6 to MPR 300—Maximum Manufacturers' Prices for Rubber Drug Sundries—lowered prices of certain products in which the synthetic is used. OPA also rephrases parts of the definitions of distributer and manufacturer to make them clearer, but not to change their meaning. This amendment as well as Amendment 5 to MPR 301—Retail and Wholesale Prices for Rubber Drug Sundries—excludes from both regulations the rubber parts of abrasive wheels and similar products now covered by MPR 316—Coated and Bonded Abrasive Products.

Order 3 under MPR 300 sets ceilings for certain neoprene bulbs made by the Acushnet Process Co., New Bedford, Mass.

On Tire Rationing

The following amendments were issued recently to RO 1A—Tires, Tubes, Recapping and Camelback. No. 27, effective May 1, reads that rationing certificates for replacement tires on farm tractors can be issued in areas where facilities for recapping the casings already on the vehicle are inadequate. No. 28, effective May 20, removes all rationing restrictions on the sale of used passenger-car and truck inner tubes, which found little demand under rationing as the purchaser with a certificate had the choice of a new or used tube. The action thus encourages demand for about 765,000 used passenger-car tubes and 225,000 used truck ones idle in dealers' stocks. The next amendment, also effective May 28, provides means whereby tire dealers requiring larger or better balanced inventories to fill customers' needs may order larger supplies than the replenishment portions of the rationing certificates on hand permit. Those dealers authorized thus to increase stocks must turn in the certificates later.

An eligible truck operator unable to get rationing certificates for new tires because his War Price and Rationing Board has exhausted its quota can obtain certificates for used tires instead, according to the OPA, which has authorized local boards to issue used truck tire certificates without regard to quota restrictions. Previously all certificates for truck tires were charged against quota. OPA emphasized, however, that replacements, whether new or used, still can go only to vehicles included in List A in the tire rationing regulations. This list covers trucks and other commercial vehicles doing work essential to the war effort or public welfare.

The OPA, the Office of the Rubber Director, and the Department of Agriculture have devised a plan to assist farmers in their vital wartime food production program by converting steel wheels on tractors to rubber tires. The program provides rubber tires and tubes for converting about 20,000 tractors and implements, originally equipped with steel wheels and sold to farmers since May 1, 1942. Local War Price and Rationing Boards will authorize such conversions on the basis of certification of individual farmer's applications by Department of Agriculture County War Boards. Since there is a shortage of rubber, the aim is to obtain the greatest possible farm output from the amount of rubber being made available for this program. This conversion plan will not require the manufacture of new tires. The Office of the Rubber Director will authorize the use only of new-style wide-base rear tractor tires, of which a considerable supply exists. Inner tubes are also in inventory for this type of tire. Only standard-size front tires and tubes to fit them will be available.

The May quota of new passenger-car tires (Grade I) was 1,006,882, against 1,058,000 for April. Quota of used and recapped casings (Grade III) for needed replacements on cars with monthly mileage of 240 or less, was 600,799 for May, against 598,000 the previous month. Truck tire quota for May, a month when commercial vehicle use of tires ordinarily increases, was 414,108 against 368,000 in April. No quota for truck tire recapping was assigned since restrictions on the number of recapping certificates that may be issued was removed May 1.

Inner tube quotas for passenger cars amounted to 735,781 for May, against 736,000 for April; for trucks, 434,355, against 338,100.

The OPA in its May 5 release, "Rationing Facts", revealed that for the period January, 1942-May, 1943, the following number of ration certificates were issued: passenger-car tires, 10,927,000; passenger-car recaps, 7,600,000; passenger-car tubes, 6,574,000; truck tires, 5,252,000; truck recaps, 4,483,000; truck tubes, 4,486,000.

The recently formed industry advisory panel of major eastern oil company executives and representatives of retailer organizations discussed trade problems arising from gasoline rationing in the eastern area where petroleum supplies are critically short, at a meeting April 29 with OPA rationing heads. Included in the panel membership are J. B. Skehan, sales manager, Standard Oil Co. of N. J., and S. B. Eckert, vice president, Sun Oil Co.

Amendment 45 to Ration Order 5C, effective May 1, lifts the ceiling on mileage

[1] Amendment 2 of MPR 220 defines "substitute rubber" as "a substance made in whole or in part by a chemical process or from natural gums, resins or oils which in physical properties sufficiently resembles natural or synthetic rubber to replace either of them for particular uses including uses where only some and not all of the physical characteristics of natural or synthetic rubber are needed, and which serves the same use as natural or synthetic rubber in the particular application in which it is applied."

allowed for in-course-of-work driving outside the eastern shortage area from 470 miles a month to 720 miles. The Office of the Rubber Director is making sufficient increased quotas available to cover the additional tire requirements.

Rubber Footwear Rationing Simplified

Effective June 5, Ration Order 6—Men's Rubber Boots and Rubber Work Shoes—is being revoked and superseded by Ration Order 6A which simplifies details for rationing men's rubber footwear.

The changes are made in completely rewritten regulations, in simple language and form. But the purpose of the regulations remains: to ration six types of industrial rubber footwear, which can be made only with a high crude rubber content, to workers who need them on essential jobs.

Announced also is an increase in the classifications of workers eligible for Type 5 rationed footwear (rubber pacs and bootees more than ten inches in height). With the WPB increasing the rubber allocation for Type 5 boots, OPA has authorized local War Price and Rationing Boards to make these boots available to the following workers when a definite need is shown: miners, loggers, communications linemen, construction workers, oil drillers, quarry workers, and clay extractors. Formerly, only miners and loggers were eligible.

In the light of 7½ months' experience since the rubber footwear rationing program started, OPA has been able to simplify the system and make the following changes:

1. A purchaser is no longer required to turn in any worn-out rubber footwear of the rationed types when he buys a new pair.

2. A new ration certificate takes the place of the three-part certificate. When the consumer uses the new certificate, he simply writes his name and address on the back before presenting it to the retailer or sending it to a mail order house. The merchant in turn endorses it and sends it to his supplier when ordering replenishments.

3. Purchasers of rationed rubber footwear may return it to the seller for refund if it has not been worn. The merchant then gives a ration certificate back to the customer. This is a new provision to take care of a situation not provided for in the original regulations.

Changes of importance to the trade:

1. From now on all trade reports and applications that formerly went to the local board are to be filed with the OPA district office.

2. Retailers no longer are required to keep detailed sales records.

3. Manufacturers are authorized to use ration certificates—either the new check-size or Part I of the original form—to acquire rationed footwear from other establishments. Formerly this authority was not specifically stated.

4. Rubber footwear for testing purposes is now available to persons other than manufacturers, formerly the only eligibles.

5. One firm may acquire, without certificates, all the rationed rubber footwear from another firm disposing of either its entire rationed rubber footwear line or its entire assets. Formerly transactions of this kind were permissible only when the entire assets were being sold. In such cases the buyer must then file an inventory and register at the OPA district office, and the seller must send all records to the district office for the area where it is registered.

Tire and Tube Industry Advisory Committee

Changes that the OPA expects to make in regulations affecting sales to government agencies of rubber tires and tubes, because of the new raw rubber prices of April 1, have led to appointment of the first formal OPA industry advisory committee of tire and tube manufacturers.

The new rubber prices are expected to affect the cost of tires and tubes sold directly or indirectly to government agencies after June 1, by which time material procured at lower prices will have given place to stock procured at the new prices.

The new Manufacturers' Tire & Tube Industry Advisory Committee will centralize contacts between the industry and OPA as work proceeds to meet the deadline for revisions in the price regulations. It succeeds the method of holding industry meetings in the less formal way of the past as amendments and regulations were being drawn up. A number of sub-committees composed of additional personnel probably will be formed. For example, a sub-committee is being organized of tire-repair materials factory specialists. Their work will be coordinated with that of the manufacturers' committee. Work of all committees will extend beyond that of the particular problems involved in the impending adjustment of price ceilings for the government-bought tires and tubes, as the committees are to serve permanently.

The manufacturers' tire and tube advisory committee consists of twelve leaders of the industry selected on the basis of personal ability, relative sizes of their companies, their geographical location, and the services their companies render. In general, the committee's function is to facilitate the program to stabilize wartime prices, and its members will be asked to furnish, analyze, and discuss information pertinent to the program. They also will advise and make recommendations to the OPA on developments which practical experience indicates will affect price stabilization.

Scheduled to hold its first meeting since organization about May 5, the Manufacturers' Tire & Tube Industry Advisory Committee is headed by R. S. Wilson, vice president, Goodyear Tire & Rubber Co., Akron, O., as chairman, and Earle McCreery, sales manager, Lee Rubber & Tire Corp., Conshohocken, Pa., as secretary. These officers were selected by the committee at a meeting in Washington on April 21. Other members follow: Paul A. Polson, vice president, Polson Rubber Co., Garrettsville, O.; Harry Webster, president, Denman Tire & Rubber Co., Warren, O.; Irving Eisbrouch, vice president, Dayton Rubber Mfg. Co., Dayton, O.; Lee Jackson, vice president, Firestone Tire & Rubber Co., Akron, O.; James J. Newman, vice president, B. F. Goodrich Co., Akron, O.; James L. Cochrun, vice president, Seiberling Rubber Co., Akron, O.; Howard Hawkes, assistant general manager, tire division, United States Rubber Co., New York, N. Y.; L. A. McQueen, vice president, General Tire & Rubber Co., Akron, O.; J. F. Schaefer, president, Master Tire & Rubber Corp., Findlay, O.; and Paul Giblin, sales manager, Armstrong Rubber Co., West Haven, Conn.

Formal industry advisory committees and sub-committees for rubber commodities other than tires and tubes are also to be named.

Other Price Rulings

Revised Supplementary Order No. 9 and Amendment 2 to Procedural Regulation No. 6, effective May 17, incorporate several changes designed to improve and clarify procedure for handling price adjustment applications on war goods.

Order 417 under 1499.3 (b) of GMPR approves maximum prices for methoxymethoxy-ethanol and Du Pont P-600 hydraulic fluid sold by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Order No. 458 under 1499.3 (b) approves maximum prices of the following du Pont textile finishing compounds: TLF-239-E, TLF-256, TLF-248-3, and TLF-248-9.

Order 455 under 1499.3 (b) of GMPR, effective May 11, specifies maximum prices for 3-M waterproof concentrated floor wax sold by Minnesota Mining & Mfg. Co., St. Paul, Minn.

Order 470 under 1499.3(b) approves ceilings for sales of compound A-176-E Navy Grey #1 made by the General Latex & Chemical Corp., Cambridge, Mass.

Amendment 5, RSR 1 to GMPR, effective May 28, broadens exemption from GMPR on sales of any used, damaged, or waste materials sold, transferred, or delivered by the War or Navy Departments to include scrap materials and used commodities and also sales of these articles by the Procurement Division of the Treasury Department. The most important scrap materials and used commodities are covered by price schedules or maximum price regulations other than the General Maximum Price Regulation.

Amendment 1, Order 9 under RPS 28-Ethyl Alcohol — retroactive to April 1, specifies a ceiling for the product of Midwest Solvents Co.

Amendment 4, MPR 37—Butyl Alcohol—effective May 7, continues ceilings for sales of normal fermentation butyl alcohol and normal fermentation butyl acetate for sales in eastern territory by producers in Indiana and Illinois. For producers in other states the prices are raised until June 30, 1943, and then again for after that date.

Amendment 33 to RPS 53—Fats and Oils—effective May 21, establishes maximum prices per pound for linseed oil.

Effective May 13 industrial naphthas, solvents, mineral oil polymers, and petroleum sulphonates were removed from GMPR and placed under RPS No. 88—Petroleum and Petroleum Products. But under Amendment 95 to the latter sellers

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Rubber Machinery Regulations Eased; Other WPB Rulings

Complete revision, issued April 29, of General Limitation Order L-61, as amended January 18, 1943—Tire Retreading, Recapping and Repair Equipment—lifts all controls over the distribution of used tire retreading, recapping, and repair equipment and also permits the production and acquisition of new tire retreading, recapping, and repair equipment with a retail value of $85 or less. The original order permitted production and acquisition of tube repair or spot equipment having a retail value of $100 or less, but this provision has now been broadened to include all items of new retreading, recapping, or repair equipment, except curing heads and matrices. These revisions were decreed by the Office of the Rubber Director.

General Limitation Order L-143-a as amended May 20, 1943—Rubber Processing Machinery and Equipment—liberalizes certain terms of the order to allow acquisition of used machinery and the repair of tire equipment not to exceed $350 in the value of materials. The order specifically makes the following changes: it permits, without specific authorization (1) acquisition of used machinery and equipment by dealers; (2) reconditioning and rebuilding of machinery or equipment, except tire molds, provided the cost of materials to be incorporated in any machine or piece of machinery does not exceed $350; (3) alterations in tire molds below the tread line. Besides minor changes have been made in List A. "Calender shells," actually supply items, have been deleted from Group 1, and "hose mandrels," have been deleted from Group IV, to relieve the Office of Rubber Director from the needless administrative burden of granting authorizations for such small items. "Rag rollers" and "tubers" have been added to Group IV. Minor changes have also been made in the definitions of "rubber processing machinery or equipment" and of "delivery." The purpose of the change in the machinery definition is to indicate the applicability of the order in cases where rubber processing machinery is actually used in processing plastics or rubber substitutes. The change in the definition of delivery brings within the restrictions of the order any transfer of machinery requiring shipment outside the continental limits of the United States.

Additional Rubber Orders

The Office of the Rubber Director placed under its control the distribution and sale of all rubber gloves formerly marketed as "seconds" or "rejects" by issuing Supplementary Order M-15-h, effective April 30. Stating that an increasing number of "seconds" or "reject" surgeons', autopsy, mortuary, and industrial gloves were reaching retail outlets where resale for household use was more profitable, the Rubber Director now will require all manufacturers of these products to file quarterly reports showing their percentage of "seconds" or "rejects." The order also provides that all "seconds" or "rejects" must now be sold either to fill war orders or to certain designated classes of persons. Permission must be obtained to consummate any other sale. It is anticipated that from time to time, as circumstances may dictate, additional items may be added to the schedule of articles included under this order.

Amendment 1 to Supplementary Order M-15-g, as Amended April 12, 1943—Rubber Tires for Industrial Power Trucks—exempts from restrictions on delivery or acquisition under the order purchase or acquisition authorized by a Preference Rating Certificate PD-1A issued prior to May 1, 1943, assigning a preference rating A-1-a or higher.

To obtain additional mileage from scrap tires that can be made serviceable with the addition of reliners, Amendment 2 (May 20) to Supplementary Order M-15-b as Amended April 13, 1943, excludes reusable tire carcasses from rubber scrap now being processed by reclaiming plants. Consequently some half million otherwise unusable tires can be placed in service through the Defense Supplies Corp. The Office of Rubber Director has also authorized the production of reliners for this purpose.

Snythetic Rubber News

Tire and tube manufacturers were afforded an opportunity to perfect their processes for production of these products from Buna S through the release of limited quantities of synthetic rubber, the Office of Rubber Director announced May 3. This action was taken to enable the manufacturers to train additional employes in the latest synthetic rubber techniques and to apply manufacturing knowledge made available by the full interchange of technical information and performance records through the Office of Rubber Director. The limited number of tires and tubes produced through this experimental program will be made available to the motoring public about June 1, through regular rationing channels under the same procedure governing distribution of all other types of tires.

On May 8 the WPB simplified authorization forms for the use and delivery of three basic ingredients in manufacturing synthetic rubber, by specifying the use of Form PD-602 instead of two forms, PD-600 and 601. The three chemicals covered follow: styrene (vinyl benzene), Allocation Order M-170; butadiene (used in making Buna-type rubber), Allocation Order M-178; and acrylonitrile (vinyl cyanide), Allocation Order M-153. The filing of applications with the WPB for use, delivery, or acceptance of delivery of styrene and butadiene in making synthetic rubber is not required of the Rubber Reserve Co., its contracting operators, or any plant owned by the United States Government, it was pointed out by the WPB Chemicals Division.

Other Orders

General Preference Order M-41 was amended May 20 to permit greater quantities of chlorinated hydrocarbon solvents for civilian use.

General Limitation Order L-43, as Amended April 16, 1943—Motorized Fire Apparatus—places specific restrictions on the delivery of suction hose, rubber tires, and equipment and accessories for use on fire apparatus. The use of critical materials, including synthetic rubber, is restricted to purposes enumerated in Schedule A of the order.

General Limitation Order L-193 as Amended May 10, 1943, restricts purchase orders for conveying machinery and mechanical power transmission equipment to those rated AA-5 or higher; also, deleted is the provision requiring submittal of monthly production and delivery schedules for restricted orders since scheduling is now covered by General Scheduling M-293. Besides the definitions of conveying machinery and under ground mining machinery have been clarified.

General Preference Order M-175—Ethyl Cellulose—was amended May 5. Among the new provisions are elimination of the general 50-pound exemption for small orders and substitution of a general 10-pound exemption and a 50-pound one for experimental purposes; use of standard chemicals allocation forms PD-600 and PD-601; and restriction of use of ethyl cellulose allocated for inventory except as specifically authorized or directed in writing by the WPB.

General Limitation Order L-287, effective May 10, strictly controls the production and delivery of portable conveyers, used to move bulk materials. Among the materials banned in the manufacture of such equipment are rubber tired wheels, vibrating screen discharge chutes, and new anti-friction bearings, except in troughing belt carriers and except for agricultural-type bearings in wheel mountings.

Limitation Order L-114, As Amended May 5, 1943—Safety Equipment—eases restrictions of Schedule A on the use of certain critical materials in making safety equipment. Thus elastic up to 21 inches in length may be used in headbands for cup-type goggles; and permitted is the use of synthetic plastics in goggle headbands in addition to the nine items previously appearing in Appendix A, since a non-critical plastic headband with some elasticity recently was developed.

Amendment 1 (May 18) to Limitation Order L-170, as Amended April 6, 1943—Farm Machinery and Equipment and Attachments and Repair Parts Therefor—covers provision for specific quantities of rubber tires for certain equipment, such tires to be made available or released by the WPB for an indicated purpose.

Priorities Regulation 18, issued May 11, prohibits producers from interfering with any frozen production or delivery schedule by eliminating, displacing, or altering the precedence of any purchase order listed for production and delivery. This rule holds, unless producers are specifically authorized or directed to interfere with their frozen schedules by (1) an amendment of the frozen schedule of WPB, or (2) one of the outstanding Special Directions relating to a synthetic rubber, toulene, high

octane gasoline, or related projects having a status of 56 or better. The term also includes production or delivery schedules approved or prescribed under any other order which WPB may issue which specifically provides that schedules thereunder are frozen schedules. Producers are required to notify the appropriate Industry Division of WPB in charge of scheduling of particular item involved, in writing, (1) when a Special Direction covering the synthetic rubber, toulene, high octane gasoline, catalyst, and related projects, is issued requiring interference with a frozen schedule, or (2) when a producer's adherence to a frozen schedule prevents the fulfillment of a purchase order not subject to the frozen schedule, which order, in the absence of scheduling, will take precedence over any such order on the frozen schedule.

Directive 21, issued by the WPB on May 1, delegates to the Director of the Office of Defense Transportation authority with respect to the use of rubber-borne transportation equipment and facilities.

Miscellaneous Notes

The Office of Civilian Supply has been studying a report—prepared at its request by a special "hard goods" committee of four business men—dealing with about 200 items and classes of items which may prove necessary for essential civilian use, and the production of which should be protected. Included are: Grinders and grindstones, sealers for home canning, basin and bathtub plugs, plumbing gaskets and washers, cotton covered lamp cord, friction and rubber tape, clothes wringers, irrigation pumps, automobile and truck chains, auto tube and tire repair kits and patches, gasket cement, automobile and bicycle pumps and valves, and storage batteries.

Producers at the recent meeting of the Differential Flowmeters Industry Advisory Committee with the Radio & Radar Division of the WPB stated that at present there is no need for the WPB to screen purchase orders for differential-type flowmeters, used largely in the production of rubber and octane gas.

A. E. Boss, of the Columbia Chemical Division, Pittsburgh Plate Glass Co., Pittsburgh, Pa., is now on the staff of Assistant Deputy Rubber Director R. P. Dinsmore, spending three or four days each week in Washington in his new capacity.

Suspension Order S-303, which charges the Russell Sales & Mfg. Co., manufacturer of fly-catching devices, 15 Park Row, New York, N. Y., with having violated General Preference Order M-15 by processing in the manufacture of flypaper solution 4,086 pounds of rubber in excess of the amount authorized from July through December, 1941, also denies the company priorities assistance and allocation of all materials governed by the WPB for the six-month period from April 30 to October 30, 1943. The firm was also found to have violated Supplementary Order M-15-b by processing 28 sheets of smoked rubber having an aggregate weight of about 6,800 pounds in making its fly-catching compound during the period from December 13, 1941, through January 17, 1942.

Small Recappers Win Government Contracts

As the result of efforts by the Smaller War Plants Corp. in conjunction with the Treasury Procurement Division and representatives of the industry, 500 small tire recappers throughout the nation will be put to work on contracts under the General Schedule of Supplies let by the Procurement Division of the Treasury Department, it was announced May 3. The Division has transmitted to about 4,000 government ordering agencies the names, addresses, delivery requirements, discounts from OPA price schedules, and other salient data regarding these shops with particular emphasis placed on the fact that it is the intention to aid small recappers. Orders to be placed with factory-owned shops will be made only when independent shops are unable to complete delivery within the required time.

In a notice to its ordering offices the Treasury Procurement Division stated that a complete explanatory report should be furnished promptly to the Procurement Division concerning any material delivered on orders placed against contracts listed herein which is found not to comply with the specifications or to be defective in construction, inadequate for the purpose for which it was bought, or otherwise unsatisfactory from the purchaser's viewpoint.

Robert W. Johnson, chairman of the Smaller War Plants Corp., notified all regional and district offices of SWPC to make certain that every opportunity is given the small recapping concerns in their areas whose names appear on the Treasury Procurement Division's list to take advantage of this business which SWPC has helped direct to them.

OPA News

(*Continued from page 276*)

may retain the ceilings already established under GMPR or use an alternative method in RPS 88.

MPR180, effective May 14, was redesignated Revised Maximum Price Regulation No. 180 and relates to ceilings for color pigments.

Order No. 291 under 1499.158 of MPR No. 188—Manufacturers' Maximum Prices for Specified Building Materials and Consumers' Goods Other Than Apparel—sets ceilings for "Rosetone", new acrylic denture material, of Hygienic Dental Rubber Co., Akron, O.

Amendment 20, MPR 165 as Amended—Services, effective May 7, provides that when an actual or threatened shortage exists of essential services in an area, either the Price Administrator or the regional administrator for the area may establish maximum prices for them.

"Physical Constants of the Principal Hydrocarbons"

A fourth edition of "Physical Constants of the Principal Hydrocarbons", by M. P. Doss, has been suggested by the Technical Advisory Committee of the Petroleum Industry War Council, and will be published by the Texas Co. if sufficient advance orders for copies are received. The third edition, issued in March, 1942, contained 215 pages and listed the properties of more than 2,000 hydrocarbons. In the proposed new edition, more than 100 pages will be revised to include new or corrected data, particularly on hydrocarbons related to the manufacture of aviation gasoline, synthetic rubber, synthetic resins, and toluene.

The book will be available at cost, approximately $5 a copy. Address M. P. Doss, The Texas Co., 135 E. 42nd St., New York, N. Y.

Detroit Group

(*Continued from page 269*)

some important differences in fundamental qualities between them and natural rubber, both as applied to ultimate quality in tires and as affecting efficiency of factory processing. Dr. Temple, moreover, stated specifically that synthetic tires were not yet equal to natural rubber pre-war tires, but pointed out that excellent development progress had been made in a period of a few months, as compared with the many years during which natural rubber tires have been built up to their present levels.

Dr. Hulswit performed table experiments illustrating differences in resilience, "shortness" at high temperatures, and in building tack.

The meeting took place at the Detroit Leland Hotel, Detroit, Mich., and was preceded by a dinner with about 70 in attendance.

New Decking Material

"Dektred", which is a new lightweight decking material with many possibilities, can be used on metal, wood, concrete, and several other types of surfaces. The material is produced in a thick, self-levelling liquid that can be applied by spraying or with steel trowel. It dries sufficiently in about three hours, in open air and under normal weather conditions, to allow light traffic. For heavy traffic, about eight hours' drying time is required, but with artificial drying, the time can be reduced to a few minutes.

"Dektred" is said to be unimpaired by cold. It may, however, soften slightly in high temperatures but returns to normal when temperatures are lowered. The manufacturer states also that the product is completely resistant to the action of oils, greases, gasoline, salt, sulphur, and cleansing detergents. Besides providing non-slip coverings for floors of all types, the material affords protection of metal from corrosion and wood from moisture. It is also said to be long wearing.

"Dektred" is particularly recommended for weather decks of war and cargo ships. It may be used, too, for officers' and crews' quarters, passageways, stair treads, washrooms, showers, and similar areas. Goodyear Tire & Rubber Co.

OHIO

Goodyear Announcements

E. L. Mefford, district manager for Goodyear Tire & Rubber Co. in New York since 1937, has been placed in charge of Goodyear's Washington office and will be succeeded in New York by D. H. Strong, district manager at Charlotte, N. C. With the title of assistant to the vice president, Mr. Mefford will report to J. M. Linforth in Akron. O. E. Miles, district manager at Baltimore, succeeds Mr. Strong at Charlotte, and Butler Doolittle, retail supervisor at Jacksonville, Fla., becomes district manager at Baltimore. Mr. Mefford started with Goodyear in 1917 as a general line salesman at Toledo, O., and since, then, has served in many phases of the company's sales activities, including service manager, store manager, and general line salesman. Before being transferred to New York, he was district manager at Columbus and later at Cleveland.

J. A. Lawrence, with the organization since 1912 and at present on the manufacturers sales staff in the Detroit office, won the Paul W. and Florence B. Litchfield Award, the company's distinguished service medal, for his excellence as a wholesale salesman during 1942.

Goodyear Aircraft Corp., Akron, will issue scholarships to young women of mathematical background to put them through a six-month intensive training course at leading schools to qualify as junior engineers at the plant. On June 1, 120 girls will start training, with the work to be given at the universities of Pittsburgh, Akron, and Cincinnati. Lectures by Aircraft engineers covering the exact work in the industry will supplement the formal instruction.

New Developments

Wartime demands are expanding the use of synthetic rubber on conveyer belts, and Goodyear disclosed that an increased number of neoprene belts is leaving its plants each month. Neoprene conveyer belts found their first application about eight years ago when coal mines started spraying coal with an oil emulsion to clean it. Natural rubber covers on the belts tended to distort under the influence of the oil. For general conveyer-belt purposes, however, Goodyear officials emphasized, natural rubber is still used as much as ever. The company further revealed that tests and experiments are under way to adapt neoprene for transmission belts also in applications where the belts might become covered with oil or grease.

Goodyear recently revealed the development of a unique heel for the footwear of U. S. Army paratroops. The heels feature a special wedge shape at the instep, instead of the conventional straight-edge design, for greater resiliency and wear, for elimination of shock and snapping effect possible with the straight edge, and for easy sliding over of any obstacle which the paratrooper might encounter when dragged over the ground after landing.

Solution "100", a new method of farm tire care, is said by Goodyear to assure longer tractor tire life and better service. The method, adapted exclusively to tires which use inner tubes and to tires running only at low speeds, means filling each tractor-tire tube to 100% of its capacity with water or calcium chloride solution. Claimed results include greatly increased traction, longer tread life, increased drawbar pull, and less bounce.

Plastic tubing with all the flexibility of rubber and said in some respects to be superior to rubber tubing, has been adapted especially for breweries and creameries by Goodyear. Made of materials far lower down on the critical list than rubber, the new tubing comes braided or unbraided, in an opaque finish or in colors. In its transparent form it can disclose any obstruction that may occur.

Goodyear has supplied nearly 30,000 feet of conveyer belts for use on the construction of the Anderson Ranch Dam, 70 miles from Boise, Idaho, which, when completed, will be the highest earthen dam in the world.

Goodrich Activities

The B. F. Goodrich Co., Akron, has appointed Frank K. Schoenfeld technical superintendent of the chemical division, according to Arthur Kelly, division general superintendent. Dr. Schoenfeld for several years had been in charge of the Koroseal research and development laboratories. He joined Goodrich in 1927. In his new post he succeeds Robert V. Yohe, recently named manager of the Kentucky synthetic rubber plant operated by the company for the government.

Chester F. Conner has been named merchandise manager of Goodrich's industrial products sales division. With the company nearly 33 years, his time lately has been devoted to mill supply organizations. Mr. Conner is also on the staff of advisers in the Office of the Rubber Director.

Henry F. Schippel, of the Goodrich company, has returned to the United States after nearly a year in Africa where he was project engineer in charge of rubber products at two large American repair and maintenance bases. Mr. Schippel, a well-known tire engineer, has been assigned to special engineering duties with the Goodrich aeronautical division and will devote full time to aeronautical problems.

Elmer R. Miller, manager of the molded goods department, industrial products sales division, retired from active service on May 1 after 44 years with the company. Starting as a stenographer in 1899, he was made assistant manager of molded goods several years later and has been manager since 1910. Mr. Miller was presented an easy chair and reading lamp by his associates at a retirement dinner.

Goodrich last month announced an additional conservation program, embodying most of the features of its Supervised Tire Consultant Service, but to be known as "The Cooperative Tire Conservation Plan." The plan provides for personalized inspections of every fleet in a unit, an analysis of such information, and submission of formal recommendations which establish controls so necessary for efficient truck operations. Designed mainly for fleets of five to fifty units, the service is available for local haulers.

One of the newest uses for Ameripol is in a specially designed thermostat to control the temperatures of lubricating oil used in certain aircraft engines.

Goodrich recently reported successful application of synthetic rubber to industrial tires in operation in a large steel mill. Four experimental tires entirely of synthetic rubber, two 22x16x16 and two 22x12x16, of the Press-On type for industrial power trucks are said to be holding up as well as tires which are made of natural rubber.

Desert Motorcycle Tire

For use in heavy sand areas where conventional tires do not have adequate traction for efficient operation, Firestone Tire & Rubber Co., has developed a new desert motorcycle tire. In size 6.00x15 and resembling a passenger-car tire, it carries only eight pounds' pressure, as contrasted with the usual 4.00x18 motorcycle tire with a pressure of 30 pounds. The tire's unusual flotation characteristics are said to result from this low pressure and the large tread contact area. The new tread design provides greater traction efficiency, featuring increased flexibility secured by eliminating all solid circumferential ribs except one on each side to resist side skid on hard surfaced roads, over which the performance of the tire has also proved satisfactory. The center of the tread and the shoulders are of small block design with a row of blocks extending well down the sidewall to protect it when hitting curves at high speeds.

Firestone Tire & Rubber Co. also has announced the first synthetic rubber tractor tire manufactured from synthetic rubber made from grain. This tire is one of a set recently completed for testing on the Firestone Farms at Columbiana.

EASTERN AND SOUTHERN

U. S. Rubber News

United States Rubber Co., 1230 Sixth Ave., New York, N. Y., through Cyrus S. Ching, director of industrial and public relations, has announced the appointment of T. J. Kiernan and R. A. Donley as supervisors of training and of personnel, respectively, in the industrial and public relations department. Mr. Donley was formerly in charge of industrial relations at Naugatuck Chemical Division; while Mr. Kiernan has been with U. S. Rubber since 1929.

U. S. Rubber is sponsoring, beginning May 23, over the WABC-Columbia network a 52-week series of regular Sunday afternoon concerts, from 3:00 to 4:30 p.m., EWT, performed by the New York Philharmonic-Symphony, which marks the first time in the orchestra's 100 years that it has had a commercial sponsor. An important feature of the weekly program will be the intermission spot presided over by Carl Van Doren, noted historian, critic, and author. Noted actors each Sunday will read "memorable American utterances."

U. S. Rubber has announced that its successful nation-wide U. S. Transportation Maintenance Program will be greatly expanded and supplemented further to aid the over-all work of the Office of Defense Transportation in keeping trucks rolling by making tire inspections, repairs, and replacements.

Chester J. Noonan, since 1938, manager of clothing, coated fabrics, and Koyalon at the company's Mishawaka, Ind., plant, has been made general sales manager of U. S. Rubber's footwear division and will have charge of all sales activities of the division, with plants in Naugatuck, Waterbury, Conn., Woonsocket, R. I., and Mishawaka.

D. W. Walsh, who joined the company in 1931 and has been in charge of tire sales in branch offices throughout the nation and who became Pacific Coast sales manager in 1941 and assistant to the general sales manager of the tire division in 1942, has now been made general sales manager of the division, according to General Manager F. S. Carpenter.

Raybestos-Manhattan, Inc., Passaic, N. J., recently held its annual meeting at the Hotel Biltmore, New York, N. Y., that took the form of a special luncheon to which stockholders were invited to hear President Sumner Simpson deliver the annual report in person. Another feature of the affair was the exhibit of war products made by the company's four operating divisions: Raybestos Division, Bridgeport, Conn.; Manhattan Rubber Mfg. Division, Passaic; United States Asbestos Division, Manheim, Pa.; and General Asbestos & Rubber Division, Charleston, S. C. Mr. Simpson outlined the progress of the corporation during the past year and predicted a continuance of the year's high sales volume. As the 250 shareholders present represented a quorum, election of the board took place; all directors were renamed.

Arthur S. Pouchot, controller of the Lee Tire & Rubber Co., Conshohoken, Pa., has been reelected a director of the Philadelphia Control of The Controllers Institute of America, 1 E. 42nd St., New York, N. Y.

A. E. Powell, on the staff of the Rubber Reserve Co., Washington, D. C., for the past several months has returned to the Flintkote Co. and is now located at the New York, N. Y., office.

Golf Products Corp., 5 Beekman St., successor to the Sam Dien Golf Co., 110 Nassau St., distributer of golf equipment, has appointed Ed. W. Simon Co., Inc., 302 Broadway, all of New York, N. Y., sales agent. The corporation is also sponsoring a Golf Ball Bank to facilitate the service of reprocessed golf balls. The company maintains a large supply of such balls in stock against which are drawn amounts equal to the number of old balls turned in by the dealer. As soon as Golf Products Corp. receives these old balls, it ships the same quantity of reprocessed balls to the dealer, thereby saving the latter five or six weeks' wait.

Franklin Research Co., Philadelphia, Pa., has added to its staff Thomas B. Dorris, lately of the engineering faculty of Manhattan College, New York, N. Y.

The Okonite Co., manufacturer of insulated wires, cables, and splicing tapes, Passaic, N. J., at its board meeting April 20 elected E. D. Youmans vice president and technical director. The next day he was also elected to similar positions with the Okonite affiliate, The Okonite-Callender Cable Co., Inc., Paterson, N. J. Mr. Youmans, since 1928 technical manager in charge of Okonite's research laboratory at Passaic, will be responsible for coordinating the entire research program of the two organizations including that of Okonite's Hazard Insulated Wire Works Division, Wilkes-Barre, Pa. Mr. Youmans joined Okonite in 1913 and attended The Brooklyn Polytechnic Institute at night to earn his degree.

Cyrus S. Ching

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., reports on satisfactory service in the Pacific war area of bomber tires made with nylon. Shortly before Pearl Harbor about 48 tires built upon nylon were made by a large rubber company and sent to Wright Field for installation on bombers which went on active duty when war was declared. Subjected to unusual punishment they have been found not wanting. Although nylon tires still are in an experimental stage, with some problems remaining to be solved, scientists engaged in the work assert they meet the most severe form of the standard bruise test without breaking.

Industrial Relations Expert

Cyrus S. Ching, director of industrial and public relations of the United States Rubber Co., New York, N. Y., is widely recognized as one of the country's foremost authorities on employe-employer relations. He has been in charge of industrial relations activities of U. S. Rubber for 24 years.

Mr. Ching was born in Canada on a Prince Edward Island farm. His early experience included such varied jobs as work in an Alberta, Canada, grain elevator and motorman for the Boston Elevated Railway Co. While employed by the railway company, Mr. Ching worked his way through the evening School of Law of Northeastern University, Boston. He was graduated in 1912 and admitted to the Massachusetts Bar. A series of promotions by the Boston Elevated culminated in his appointment as assistant to the president in charge of personnel. From that position he went to U. S. Rubber in 1919 in charge of industrial relations.

"Cy" Ching, as he is known to business and union leaders and his many friends, stands six feet seven inches and weighs about 230 pounds. He lives at Jackson Heights, N. Y., and his business office is in the United States Rubber Co. Building, Rockefeller Center, New York, N. Y. He has lectured at several leading colleges and universities and is much in demand as a speaker. In May, 1942, Dartmouth conferred on him an honorary degree of Doctor of Laws. Articles on many phases of industrial relations problems written by Mr. Ching have appeared in periodicals of national circulation.

In 1941 he was appointed a member of the National Defense Mediation Board and is now on the War Labor Board. He has also served as president of the American Management Association; chairman of the immigration committee of the National Association of Manufacturers; and as a member of the Advisory Commission of the National Industrial Conference Board, and as a member of the New York Regional Labor Board.

NEW ENGLAND

George Nelidoff Studio, Chicago

John Wolcott Haddock

Haddock Farrel Head

Farrel-Birmingham Co., Inc., Ansonia, Conn., has announced the election to the presidency, effective May 1, of John Wolcott Haddock, formerly vice president of the Sullivan Machinery Co., Claremont, N. H., with which he began his business career as a stock clerk in its Michigan City, Ind., plant. He became successively shop apprentice, clerk, and assistant production manager before being transferred to the Claremont plant. Later Mr. Haddock went to the New York, N. Y., office as salesman, then to the general offices in Chicago, Ill., as assistant to the general sales manager, and then was appointed assistant vice president in charge of sales. In 1935 he was made general manager of the Michigan City division with complete charge of the plant and the engineering, manufacture, and sale of its products. In 1938 he was named vice president in charge of engineering and sales for the company. The new Farrel president belongs to the American Institute of Mining & Metallurgical Engineers, Army Ordnance Association, Compressed Air Institute, and the American Mining Congress. Mr. Haddock was born in Polo, Ill., August 22, 1904.

American Wringer Co., Inc., Woonsocket, R. I., has revised its group insurance program for its employes in Rhode Island, by adding hospital expense and surgical operation benefits. The revised group plan will continue to be underwritten by the Metropolitan Life Insurance Co., New York, N. Y., on a cooperative basis whereby the employes contribute fixed amounts and the employer bears the balance of the entire net cost.

Ralph D. Berry, vice president, Davol Rubber Co., Providence, R. I., recently was elected vice president of the New England Purchasing Agents Association, of which he formerly had been treasurer.

Warwick Chemical Co., West Warwick, R. I., will manufacture synthetic waxes under the direction of Ernest Stossel, according to Vice President D. S. Chamberlin. The company is constructing a new unit for this project, soon to be under way.

Rhode Island rubber manufacturers during April paid out $397,271 in wages, 1.6% over the March figure and 31.3% above that for April, 1942.

U. S. Rubber's footwear plant at Naugatuck, Conn., on April 26 celebrated its one hundredth birthday with fitting ceremonies. The principal speaker was Elmer H. White, general manager of U. S. Rubber's footwear divisions. Also honored were more than 500 employes who have served the company a quarter-century or more.

J. E. Purdy Co., Inc.

Russel G. Allen

Cabot Announcements

Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass., through Vice President Thomas D. Cabot has announced that its new plant near Guymon, Okla., manufacturing Sterling brand of furnace carbon black, started operations in April. A second large plant is under construction near Ville Platte, La.

Russel G. Allen, formerly manager of manufacturing operations in the southwest for Cabot, is moving to the main office in Boston as vice president. Mr. Allen graduated from Haverford in 1923, joined the Cabot organization in Texas in 1925 and was employed in the southwest and in West Virginia until he was placed in charge of the southwestern division in 1930 with headquarters at Pampa, Tex.

Hugh Burdette, eastern production manager, succeeds Mr. Allen at Pampa. His former position will be filled by the promotion of L. J. Morris, who will direct operations in West Virginia, Pennsylvania, and New York from the Cabot office in Charleston, W. Va. Mr. Burdette has been with Cabot since 1920, and Mr. Morris since 1922.

Hugh Burdette

CANADA

Dominion Rubber Meeting

At the recent annual meeting of Dominion Rubber Co., Ltd., Montreal, P. Q., the following five new directors were elected: G. W. Charles, vice president and general manager, footwear division; C. C. Thackray, vice president and general manager, tank tracks and new products; M. O. Simpson, treasurer; A. W. Hopton, vice president and general manager, tire division; and H. S. Marlor, vice president, United States Rubber Co., New York, N. Y., U. S. A. Directors reelected were: Norman J. Dawes; W. S. Rugh; A. A. Magee; W. A. Eden, vice chairman of the board; Paul C. Jones, president of the company; F. B. Davis, chairman; H. E. Humphreys, Jr.; Herbert E. Smith; T. J. Needham; and Elmer Roberts.

Mr. Jones also reported receipt of a contract from the Department of Munitions & Supply, Ottawa, Ont., to operate a small arms ammunition plant, Dominion Rubber Munitions, Ltd. Located in eastern Canada, it will soon go into production under the auspices of Brigadier D. E. Dewar, director-general arsenals and small arms ammunition of the Department of Munitions & Supply. The plant will employ about 1,000 men and women. A. G. McKinnon, formerly of one of Dominion Rubber affiliated companies, has been appointed general manager.

Reviewing the year's operations of Dominion Rubber, Mr. Jones said that the production of tires for combat vehicles, footwear, waterproof clothing, and mechanical goods for the armed forces had reached record proportions; while the supply of rubber requirements for essential civilian uses has been uninterrupted. Diversification of products, as the manufacture of steel tank tracks, textile goods, and chemicals, has been a major factor in the company's activities during the past year, Mr.

Jones declared, and forecast new developments that will further increase the scope of the company's operations. Many new lines developed during the past three years will have an important part in the company's postwar operations.

He also pointed out that some synthetic rubber produced in Canada for the needs of the armed services would appear before the remaining supply of crude rubber is gone. The company is producing thousands of pounds of reclaimed rubber monthly.

Wilbur A. McCurdy has been appointed assistant director of purchases at Dominion Rubber, according to H. R. Nixon, director of purchases. Starting with the company in 1916, Mr. McCurdy has been connected with manufacturing units in Granby and Montreal and became customs auditor at the company's head office before joining the purchasing department in 1920.

Rubber Controller Alan H. Williamson on May 1 issued an order restricting sales of protective rubber clothing to essential users. The order requires prospective purchasers to fill in certificates of essentiality which will be attached to the garments by the manufacturers. The order covers firemen's coats, mining suits and hats, fishing suits, souwesters, acid-resisting aprons, and standard long and three-quarter length coats where a component of these garments is crude, natural, or any synthetic rubber which can be vulcanized. "Rubber" includes balata, gutta percha, guayule, liquid latex, and reclaimed and scrap rubber. Classified as essential users are those engaged in fire-fighting, decontamination work, electrical work where protection is needed, mining, tanning, logging, lumbering, outdoor construction, outdoor shipbuilding, railroad yard switching, occupations which include handling exposed acid, seafaring, as fishing, merchant marine, and pilotage service, and any commercial occupation on Canada's inland waters. The order was postponed from April 30 until June 1 to allow manufacturers to obtain the necessary essentiality certificates.

Mr. Williamson is also urging every Canadian to make himself responsible for ridding the country's highways, streets, roads, and lanes of broken glass and other tire hazards.

P. Horace Boivin, president, Granby Elastic Web Co., Ltd., Granby, P. Q., and mayor of that city, has been elected president of the Eastern Townships Board of Trade.

Weiss & Biheller (Canada) Ltd., Toronto, Ont., has been appointed sole Canadian distributer for Prolatex, a new product described as a tire saver. It is said to be scientifically formulated for preserving rubber and is applied to automobile tires by an immersion process without removing them from the car. Prolatex is a rubber penetrant of soya-bean oil base and is claimed to have been laboratory tested and approved in actual service for filling pores, minor cuts, and abrasions and effectively sealing tires against natural enemies of rubber.

Montreal Section Election

The Rubber & Plastics Division of the Montreal Section, Society of Chemical Industry, recently elected the following officers for the 1943-44 season: honorary chairman, R. V. V. Nichols, McGill University; chairman, A. B. Lewis, British Rubber Co. of Canada, Ltd.; vice chairman, R. S. Jane, Shawinigan Chemicals, Ltd.; secretary, J. T. Dunn, Dominion Rubber Co., Ltd.; program committee, H. Chauvin, Miner Rubber Co., Ltd., and H. L. Blachford; publicity, magazine, W. P. B. Gedye, Miner Rubber; publicity, newspaper, E. A. Thorn, Diamond State Fibre Co.; reception committee, J. H. McCready, Hale Bros., and J. R. Mills, Dominion Rubber; membership committee, L. C. McLeod, Monsanto Canada, Ltd., and W. B. Jonah, Northern Electric Co., Ltd.

The organization is arranging for a summer golfing outing. Details will be forthcoming.

The Department of Munitions & Supply, Ottawa, Ont., has placed on a permit basis sales of the heavy double-jacket fire hose used by the larger fire departments. The new order provides that single-jacket fire hose must not be sold until the buyer has certified in writing that the hose is required immediately for protection against fire.

Gutta Percha & Rubber, Ltd., Toronto, Ont., is celebrating its sixtieth birthday. Keyed to the war effort, the firm is now making fire hose, tires, stirrup pump hose, rubber footwear, parts for gas masks, aircraft, tanks, etc.

J. Ross Belton has been made general manager of Gutta Percha & Rubber, according to President F. A. Warren. Mr. Belton, assistant general manager since 1936, joined Gutta Percha in 1920 and occupied positions of increasing importance in both the factory and head office. Born in London, Ont., Mr. Belton is a veteran gunner and pilot of the last war. His education, first at the London Collegiate Institute, and later at the University of Toronto, was interrupted by his enlistment in 1915. In 1919 he resumed his studies and graduated with his B.Sc. from Queen's University in 1920. He is a member of the American Management Association and permanent president of the Science Class '20, Queen's University.

E. J. Hayes, of Gutta Percha & Rubber, at the recent annual meeting of the Ontario Chapter, National Industrial Advertising Association, was elected secretary.

Frank Dowsett, director of publicity for the Gutta Percha company, recently addressed the Advertisers' Guild.

R. C. Berkinshaw, president, Polymer Corp., and general manager of Goodyear Tire & Rubber Co., of Canada, Ltd., New Toronto, Ont., addressed the Ontario Motor League at its recent annual meeting in Toronto. Mr. Berkinshaw described the government's synthetic rubber development, saying that 4,000 men are working night and day on various units comprising the project. He also declared that the plant is expected to be in production before the end of 1943. Mr. Berkinshaw was elected one of the vice presidents of the League.

Charles LaFerle, National War Services salvage director, has announced that at least 10,000 tons of tires and tubes must be collected the remainder of 1943 to meet the essential requirements of the armed forces. He quoted H. C. Jeffries, president of Fairmont Co., Ltd., Crown company established to purchase crude and scrap rubber, as stating the reclaim rubber situation "continues very urgent." Mr. LaFerle said volunteer groups across Canada were being urged to concentrate their efforts on the collection of tires and tubes; so the Fairmont company objective of 10,000 tons might be met.

John Baird, Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., was elected secretary of the Young Men's Advertising & Sales Club of Toronto at its recent annual meeting.

Miner Rubber Co., Ltd., Granby, P. Q., has made Leslie Leet acting branch manager in Toronto, Ont. Mr. Leet, with the company more than two decades, recently represented it in eastern and northern Ontario, where he has been succeeded by E. C. Quartermain.

T. Y. O'Neill, general sales manager at Miner, recently slipped and broke his hip in Montreal. He was confined for some time at the Western Division General Hospital, but now has sufficiently recovered to be removed to his home.

James I. Simpson, president and general manager of Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., was recently elected president of the Rubber Association of Canada. He is also chairman of the Rubber Advisory Committee to the Rubber Controller.

J. C. Newton, General Tire & Rubber Co. of Canada, Ltd., Toronto, Ont., was a speaker before the Society of Fleet Superintendents of Montreal, which met recently as guests of Ludger Gravel, of Ludger Gravel & Fils, Ltd. Mr. Newton discussed rubber conservation in truck fleets.

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	Inquiry
2887	Substitute perfected to take the place of rubber cement.
2888	Manufacturers of golf ball winding machines.
2889	Manufacturers of abrasive grinding wheels.
2890	Manufacturers of hard rubber funnel.
2891	Manufacturers of Softeners SDO #10 and DO #10.
2892	Manufacturer of Corprene.
2893	Information wanted on Granilha Gum.

FINANCIAL

American Cyanamid Co., New York, N. Y., and subsidiaries. March quarter: net income, $1,628,376, equal, after preferred dividends, to 62¢ each on 2,639,026 common shares, contrasted with $1,299,900, or 49¢ each on 2,618,364 shares, in the first quarter of 1942; tax provisions, $5,245,846, against $3,823,473.

Anaconda Copper Mining Co., New York, N. Y., and subsidiaries. March quarter: consolidated net income, $9,085,359, equal to $1.05 a share, against $9,960,516, or $1.15 a share, in the first quarter last year; taxes, $8,150,000, against $12,624,555.

Brown Rubber Co., Inc., Lafayette, Ind. Year ended January 2, 1943: net loss, $93,867, contrasted with net profit of $20,780, or 10¢ a share, in the year ended January 3, 1942.

Columbian Carbon Co., New York, N. Y. First quarter: net income, $842,399, or $1.57 a share, against $841,814, or $1.57 a share, in the 1942 period.

Crown Cork & Seal Co., Baltimore, Md., and domestic subsidiaries. First quarter, 1943: net profit, $316,288, equal to 37¢ a common share, against $334,538, or 40¢ a share, in the same quarter last year; federal income and excess profits taxes, $556,500, against $553,852.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and wholly owned subsidiaries. Three months ended March 31: net income, $14,739,314, equal, after preferred dividends, to $1.16 each on 11,110,090 common shares outstanding, compared with $14,310,157, or $1.12 each on 11,106,366 shares outstanding, in the 1942 quarter; sales, $133,622,229, against $122,023,170; income and excess profits taxes, $29,557,000, against $25,250,000.

Flintkote Co., New York, N. Y., and subsidiaries. Twelve weeks to March 27: net income, $244,224, equal, after preferred dividends, to 28¢ each on 713,706 common shares, compared with $306,490, or 37¢ each on 705,435 shares, in the corresponding weeks last year; net sales, $6,198,255, against $5,905,374; taxes, $536,038, against $482,536.

General Cable Corp., New York, N. Y. March quarter: net profit, $464,620, against $946,052, in the 1942 quarter, when dividend requirements on the 7% preferred and the 306,689 shares of Class A stock were met, leaving 50¢ a common share; but this year the dividend on the Class A stock was only two-thirds covered.

General Motors Corp., Detroit, Mich. March quarter: net profit, $33,074,031, equal, after preferred dividends, to 71¢ each a common share, against $23,229,991, or 48¢ a share, a year ago.

New Jersey Zinc Co., New York, N. Y. March quarter: net profit, $1,736,491, or 86¢ a share, against $2,291,334, or $1.17 a share, for the 1942 period.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. First quarter, 1943: net profit, $468,532, or 75¢ a share, against $485,619, or 77¢ a share, the same time last year.

Rome Cable Corp., Rome, N. Y. Year ended March 31: net profit, $348,916, equal to $1.83 a common share, against $601,165, or $3.16 a share, in the preceding year.

Skelly Oil Co., Kansas City, Mo., and subsidiaries. First quarter, 1943: net income, $1,231,925, or $1.25 each on 981,348 common shares, against $1,300,036, or $1.32 a share, in the previous March quarter; income and excess profits taxes, $898,300, against $1,157,580.

Thermoid Co., Trenton, N. J., and domestic subsidiaries. First quarter: net profit, $242,475, against $210,029 the 1942 quarter. Year ended March 31, 1943: net profit, $466,890, against $678,295 in the preceding 12 months.

Timken Roller Bearing Co., Canton, O. March quarter: net profit, $1,579,513, equal to 65¢ a share, against $1,461,766, or 60¢ a share, in the 1942 period; provision for income tax, $974,600, against $1,560,900; provision for excess profits tax, $7,435,000, against $4,351,000.

Union Carbide & Carbon Corp., New York, N. Y. March quarter: net income, $9,382,021, equal to $1.0112 each on 9,277,788 shares, against $9,416,304, or $1.0149 a share, in the 1942 quarter.

United Carbon Co., Charleston, W. Va., and subsidiaries. March quarter: net income, $507,139, or $1.27 each on 397,885 capital shares, against $522,111, or $1.31 a share, in the first quarter of 1942; provision for federal income and excess profits taxes, $393,000, against $345,000.

New Incorporations

Bell Plastics Mfg. Corp., New York, N. Y. Capital, 200 shares, no par value. Weinshenker & Weinshenker, 117 Liberty St., New York, N. Y. Plastic products of all kinds.

Crescent Specialty Co., Inc., New York, N. Y. Capital, 200 shares, no par value. J. R. Marro, 270 Broadway, New York, N. Y. Wood, leather, rubber, paper, and plastic goods.

Galleher Rubber Co., Cleveland, O. Capital, 250 shares, no par value. E. A. Galleher, Jr., H. R. Harwood, A. H. Van Horn, Leader Bldg., Cleveland, O.

Klozo, Inc., New York, N. Y. Capital, 200 shares, no par value. M. A. Pomeranz, 276 Fifth Ave., New York, N. Y. Rubber, bone, metal, wooden products.

Korex Coating Corp., Brooklyn, N. Y. Capital 200 shares, no par value. Rosen & Goldman, 1440 Broadway, New York, N. Y. Coated fabrics, adhesive tapes, and the like.

Mar-Conized Products, Inc., New York, N. Y. Capital 200 shares, no par value. Max Blecher, Jr., 1501 Broadway, New York, N. Y. Plastics, acetates, Pliofilm, lacquers, etc.

New York Waterproofing Corp., New York, N. Y. Capital, 25 shares, no par value. J. Halpern, 170 Broadway, New York, N. Y. Waterproofing of all kinds of textiles, etc.

Plastex Adhesive Products, Inc., Kings County, N. Y. Capital 200 shares, no par value. M. Sheinfeld, 320 Fifth Ave., New York, N. Y. Coated materials, yarns, etc.

Wire Cord & Cable, Inc., Pawtucket, R. I. Capital, 100 shares, no par value. H. P. Wright, C. Zimmerman, A. D'Amario, all of Providence, R. I. Manufacture wire, cord, and cable.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Belden Mfg. Co.	Com.	$0.37½ q.	June 1	May 17
Boston Woven Hose & Rubber Co.	Com.	0.50	May 25	May 15
Boston Woven Hose & Rubber Co.	6% Pfd.	3.00 s.	June 15	June 1
Canada Wire & Cable Co., Ltd.	A	1.00 q.	June 15	May 31
Canada Wire & Cable Co., Ltd.	B	0.25 q.	June 15	May 31
Crown Cork & Seal Co., Inc.	$2.25 Cum. Pfd.	0.56¼ q.	June 15	May 28
Dewey & Almy Chemical Co.	Com.	0.25 q.	June 15	June 1
Dewey & Almy Chemical Co.	B	0.25 q.	June 15	June 1
Dominion Textile Co., Ltd.	Com.	1.25 q.	July 1	June 5
Dominion Textile Co., Ltd.	7% Pfd.	1.75 q.	July 15	June 15
Dunlop Rubber Co., Ltd.	Com.	8%	July 1	May 22
Dunlop Tire & Rubber Goods Co., Ltd.	5% Cum. 1st Pfd.	2½%	June 30	June 15
E. I. du Pont de Nemours & Co., Inc.	Pfd.	1.12 q.	July 24	July 9
E. I. du Pont de Nemours & Co., Inc.	Com.	1.00	June 14	May 24
Electric Hose & Rubber Co.	Com.	3.00 irreg.	April 22	April 15
Electric Storage Battery Co.	Com.	0.50 q.	June 30	June 9
B. F. Goodrich Co.	Com.	0.25	June 15	June 1
B. F. Goodrich Co.	5% Pfd.	1.25 q.	June 30	June 22
General Electric Co.	Com.	0.35	July 26	June 25
Goodyear Tire & Rubber Co., Inc.	Com.	0.50	June 15	May 15
Goodyear Tire & Rubber Co., Inc.	Cum. Con. Pfd.	1.25 q.	June 15	May 15
Hercules Powder Co.	Com.	0.50	June 25	June 14
Hewitt Rubber Corp.	Com. Cap.	0.25 q.	June 15	June 1
I. B. Kleinert Rubber Co.	Com.	0.20	June 12	May 29
Midwest Rubber Reclaiming Co.	Pfd.	1.00 q.	June 1	May 21
Phelps-Dodge Copper Corp.	Com.	0.40	June 10	May 25
Raybestos-Manhattan, Inc.	Com.	0.37½ q.	June 15	May 28
Russell Mfg. Co.	Com.	0.50	June 15	May 29
Seiberling Rubber Co.	Pr. Pfd.	0.62 q.	July 1	June 19
Seiberling Rubber Co.	A Pfd.	1.25 q.	July 1	June 19
Thermoid Co.	$3.00 Pfd.	0.75 q.	June 15	June 2
United Elastic Corp.	Com.	0.35 q.	June 24	June 3

OBITUARY

Ellwood B. Spear

A HEART attack May Day caused the death of the noted rubber authority, Ellwood Barker Spear, at his farm in Milford, N. H., where he was spending the years of his retirement. Born in Aurora, Ont., Canada, February 22, 1875, Dr. Spear was educated at the universities of Manitoba, McGill, Toronto, Leipsig, and Heidelberg. He also served, successively, from 1907-1920 at the Massachusetts Institute of Technology as research assistant instructor, assistant professor, and associate professor of chemistry.

Then the deceased joined the Goodyear Tire & Rubber Co., Akron, O., as manager of its research department. In 1922 he left to become chief chemist and vice president of the Thermatomic Carbon Co., Pittsburgh, Pa., where, among his achievements, he developed P-33. In 1929, however, Dr. Spear resigned from the company. The next year he engaged in research and development for the Vultex Chemical Co., Cambridge, Mass.

In World War I, Dr. Spear was "a dollar a year man" in Chemical Warfare, specializing in carbon for gas masks. During his lifetime he wrote much and patented many developments of interest to the rubber industry. He also belonged to the Chemists Club of New York, American Association for the Advancement of Science, and the American Chemical Society. He had served as vice chairman and then as chairman of the A. C. S. Rubber Section.

Interment occurred at Cambridge Cemetery, Cambridge, Mass.

Survivors are the widow and two nephews.

Lothar W. Faber

AFTER a brief illness Lothar W. Faber, president of the Eberhard Faber Pencil Co., Brooklyn, N. Y., and vice president of the Eberhard Faber Rubber Co., Newark, N. J., died May 12 at his home in New York, N. Y. Funeral services were held the fourteenth.

The deceased, a son of Eberhard Faber, founder of the concern, was born in New York 81 years ago. He joined the pencil company in 1885 and was elected its president in 1898. He became vice president of the rubber concern in 1913.

Mr. Faber attended Heidenfeldt's Primary School, New York, the Hawkins School, Staten Island, and Columbia School of Mines, graduating in 1882. Then he spent a year in Paris and Vienna.

He leaves a daughter, a son, seven grandchildren, and a brother.

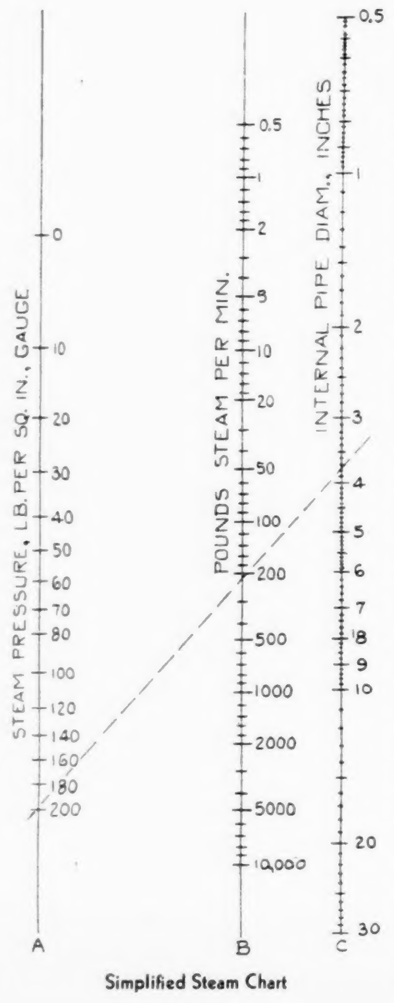
Rubber-Plant Steam Pipe Chart

EVERY rubber plant executive knows that many pages have been devoted during recent years to steam charts and formulas, but unfortunately both the charts and the formulas are usually more or less bewildering. The accompanying chart represents an effort to make one as simple as possible. It requires only one operation for the solution of the problem. It is based upon the velocity of steam that is used most: namely, 6,000 feet per minute.

For example, what size of steam pipe shall be used where the steam pressure is 200 pounds gage and where 225 pounds of steam are to be used per minute? Simply run a straight line through the 200, column A of the chart, and the 225, column B. The intersection with column C gives the answer as 3.75 inches internal pipe diameter, which is close to a four-inch pipe; therefore one that size should be used.

If the steam pressure is known, column A, and the pipe is already installed, the diameter, of course, is known, column C; and the pounds of steam the pipe will carry per minute is easily determined by connecting the known factor in column A with the known factor is column C. The intersection with column B gives the pounds of steam per minute.

This chart will be found satisfactory for most short pipes where the pressure drop is small, amounting to only two or three pounds, as most steam pipes are short.



Simplified Steam Chart

Rubber Reserve Circulars

(Continued from page 264)

conditional price basis, the original prices to be those set forth in Exhibit "A," Circular No. 17, in the column designated "Civilian Use," subject to the payment of an adjusted price as provided in Paragraph 5 hereof. A uniform freight charge of one-half cent (½¢) per pound, based on net delivered weight for carload quantities (at the minimum weight provided for by the applicable freight rate), or one cent (1¢) per pound for less than carload quantities, based on net delivered weight, will be added to the selling prices.

3. All requests for the issuance of purchase permits should be addressed to the Office of the Rubber Director as has been the custom heretofore.

4. Deliveries of crude rubber, guayule and liquid latex will be made in the manner prescribed in Circular No. 17.

5. Each manufacturer will be required to show on his monthly report to the War Production Board (Form PD-49) the quantity of crude rubber, guayule and liquid latex which was used in the manufacture of end-products delivered or invoiced on War and Civilian Orders. The report dated July 31, 1943, will cover end-products delivered or invoiced during the month of June. Reports dated on the last day of succeeding months will cover end-products delivered or invoiced during the preceding calendar month. A copy of the monthly report (Form PD-49) should be mailed to the Treasurer of Rubber Reserve Co., 811 Vermont Ave., N. W., Washington, D. C., together with a certified check or banker's New York draft payable to Rubber Reserve Co., in an amount equal to 17½¢ multiplied by the number of pounds of crude rubber, guayule and liquid latex used in end-products delivered or invoiced on War Orders. This amount will represent the unpaid part of the adjusted purchase price owed to Rubber Reserve Co. No adjustment of the purchase price shall be made with respect to those quantities of crude rubber, guayule and liquid latex shown on said monthly report (Form PD-49) that have been used in the manufacture of articles for civilian use.

6. Those manufacturers who have purchased crude rubber, guayule and liquid latex from Rubber Reserve Co. at the prices set forth in Exhibit "A," Circular No. 17, in the column designated "Other Than Civilian Use" which became effective April 1, 1943, should prepare a debit memorandum against Rubber Reserve Co., computed on the total of such purchases at the difference between the prices shown in the columns designated "Civilian Use" and "Other Than Civilian Use." The debit memorandum so prepared should be attached to the copy of the monthly report (Form PD-49), dated July 31, 1943, which is mailed to the Treasurer of Rubber Reserve Co. Such manufacturers shall deduct from the amount owing under Paragraph 5 above the amount of the debit memorandum attached to such report and shall accompany such report with a certified check or banker's New York draft covering the balance due. In the event that the amount of the debit memorandum is greater than the amount due Rubber Reserve Co. under the provisions of Paragraph 5 above, the excess may be similarly deducted for the next ensuing month or months.

7. In view of the foregoing, the words "Civilian" or "Non-civilian" will not appear on purchase permits issued on or after May 1, 1943.

8. This circular has been approved by the Office of the Rubber Director.

April 30, 1943.

EUROPE

SOVIET RUSSIA

New Lacquers for Rubber Footwear

In 1939 and 1940 research was conducted in Russia to reduce the amounts of linseed and other oils and fats used in making the factice bases of lacquers, and also to cut the quantity of organic solvent (white spirits) utilized for making the lacquer solutions. In the first instance, efforts were made to replace linseed oil entirely by semi-drying oils (rapeseed oil) and fats from marine animals (seal oil), and the latter again, at least in part, by preparations made from synthetic rubber scrap.

The synthetic rubber scrap was subjected to heat treatment at 260-270° C., and sulphur was added, following the principle employed in making factice lacquers based on oils or fats. The sulphur was incorporated in the mass, and the mass boiled until a compact thread was obtained; the temperature range was 120-150° C. Then the whole was dissolved in white spirits.

The scrap usually contains compounding ingredients which would impair the aging qualities and the luster of the lacquer if not removed; consequently the solution was allowed to stand in vessels holding 7,500-8,000 liters for eight to ten days. For more complete removal of the ingredients, the mass was centrifuged; then the preparation was mixed with the lacquer base at reduced temperature, and the resultant lacquer filtered, allowed to stand for a while, and used in the customary way.

At the Krasnyie Bogatyr works lacquers have been used containing 50 grams of the thermally treated vulcanized rubber scrap for every 100 grams of fats. Three different types of lacquers have been compared: (1) a lacquer made with linseed oil only; (2) lacquer made with 75 grams seal oil and 25 grams rapeseed oil; (3) lacquer made with 75 grams seal oil, 25 grams rapeseed oil, and 50 grams scrap rubber preparation. It was found that the use of the scrap rubber preparation on the whole did not have an adverse effect on the quality of the lacquer and in some cases even improved it with regard to adhesion.

A different series of tests attempted to reduce, if not entirely eliminate, the amount of white spirits required in making lacquers. This reduction it was proposed to accomplish by developing quick-drying water emulsion lacquers.

In preparing the factice used as a base for lacquers, it is known that the further the process is carried, the greater the drying capacity of the lacquer becomes. However the longer the mass is boiled, and the more it approaches the state of a dry factice, the less soluble it is in organic solvents. But it is known that by changing the conditions of solution, materials not otherwise soluble in other substances can be made soluble, and in this case it was found that a lacquer base boiled until it was a perfectly dry factice could be dissolved by subjecting it to thermal treatment in an autoclave under pressure in the presence of organic solvents. Such solutions yielded even, glossy films with normal resistance to aging; and as tests at the Krasnyie Bogatyr showed, their drying time was reduced by 30%.

The next step was to obtain quick-drying water emulsion lacquers, and the factice was subjected to heat treatment under pressure in the presence of solvents of the aliphatic series, not more than 20% of solvent, calculated on the lacquer base being used; then suitable emulsifiers (triethanolamine and oleic acid) and water were added, yielding satisfactory stable emulsions. Now in boiling the factice two phases of the interaction of sulphur and fats were observed. The first phase was when the sulphur, added to the oil, after a known period of thermal treatment seems to dissolve in it, causing practically no change in the viscosity of the oil. It is pointed out that if a chemical combination of the sulphur and the oil took place here, it was insignificant in extent and did not produce polymerization and vulcanization of the oil and increased viscosity.

The second phase, it is suggested, seems to be a typical example of the physico-mechanical action of sulphur on oil, in consequence of which the latter begins to thicken, to lose mobility. It is pre-

cisely the first phase which is of interest in regard to the mobility of the system and the thorough distribution of the sulphur in it. Both factors, it is suggested, probably aid in insuring normal emulsification.

The lacquer base is heated with sulphur only up to the first stage of the process and is then converted into an emulsion with the emulsifiers and water. This action occurs in the autoclave with thermal treatment under pressure and constant stirring. Under these conditions further combination of sulphur and oil proceeds in a perfectly normal manner, and the state of the emulsion and its stability are maintained. Lacquers thus obtained differ in no way from the usual emulsion lacquers obtained in the presence of solvents, either in regard to behavior or quality.

Tests were also made to obtain water emulsion lacquers by directly emulsifying lacquer bases and then working sulphur into them in the autoclave under definite thermal conditions, and positive results were obtained by this method also.

This method offers the possibility of preparing the base in advance in the form of a factice, in central factories, from which it could be distributed for solution and emulsion, as required, for apparently there is no need to fear that storage of the base would lead to any impairment of the quality of the finished lacquers, but this point had not yet been investigated.

The autoclaves, by the way, should be steam-jacketed and have mixers whose revolutions can be regulated so as to amount to 150-250 per minute.

Notes

When a few years ago Soviet technologists discovered that high polymers of acetylene are formed as by-products in the course of producing Sovprene, the Russian synthetic rubber corresponding to neoprene, experiments were immediately initiated to determine the possibility of utilizing them as a basis for plastics. As a result, plastic masses having several valuable properties, including extremely high resistance to acids, alkalis, and solvents, and good mechanical properties, were developed based on divinyl-acetylene. Few details are given about these plastics, but it appears that asbestos was used as a filler, when the materials were said to be especially suited for making acid-proof tubes, tiles, sheets, and in the manufacture of chemical apparatus, as linings, or otherwise.

The latest reports on the plantation of *kok-saghyz* state that its area in the Soviet Union now totals 625,000 acres. A new system of extracting the latex from the plant has been announced. Whereas formerly *kok-saghyz* and similar small plants were crushed, thus killing the plant, a method has been developed of tapping the root-stock, a process which, it seems, can be repeated eight or ten times a season. In this way the plant is kept alive; yet the yield obtained is almost double that when crushing was resorted to.

GREAT BRITAIN

Growing Interest in Plastics

Plastics have advanced enormously in importance since the Japanese seized the rubber countries of the Far East, and in England, too, the investigation and manufacture of these materials are receiving ever-increasing attention. Numbers of firms devoted to the production of goods from plastics are being formed, and there are frequent scientific discussions of matters pertaining to plastics.

At a recent conference of the Association of Scientific Workers at Westminster, "Science in War Time" was discussed. One speaker, Harry Barron, rubber chemist, dealt with the prospects of the plastics industry in the future. These, he said, were extremely bright and Britain must lead in the coming Plastics Age as she did in the Steel Age. But Great Britain's showing in the new plastics so far was not at all impressive; on the existing basis, the country could hardly hope to export the newer plastics in the future, and there were no present indications that any British materials could possibly compete, as far as cost was concerned, with those produced in the United States or Germany. Dr. Barron,

a strong advocate of synthetic rubber production in Great Britain, then went on to point out that the American synthetic rubber industry would insure an enormous cheap supply of by-products for the American plastics industry. He urged that even though feeling in England was against a synthetic rubber industry, the country should at least "consciously go for plastics in as big a way as possible."

The need of correcting certain erroneous impressions about plastics commonly held by the general public was emphasized by Stanley M. Mohr at a luncheon of the British Plastics Federation in February. Major Mohr, chairman of the organization, commenting on the great interest shown of late by investors in shares of plastics concerns, stated he was not sure this state of affairs was altogether desirable. He felt that the public should be enlightened on various points relating to the plastics industry. For one thing it should be informed that the industry in England still had many obstacles to overcome and problems to solve before it could reach full development. The public, he went on to say, harbored certain misconceptions not only about the developmental stage of plastics, but also about their nature and value; it was widely believed that all plastics were really one material, and furthermore that plastics were extremely cheap and therefore shoddy in quality. The council of the Federation, he added, was considering an educational campaign to enlighten people on the real nature of plastics, their uses, and limitations.

The possibilities of synthetic resins, particularly as structural materials, formed an important part of H. W. Melville's address before the Royal Society of Edinburgh on March 1. Synthetic resins are destined to play a significant role in the future as structural materials for engineers, superior fibers for the textile technician, rubber for special purposes (synthetic rubber, the professor explained, though in a different category, is really a synthetic resin), and as organic glass with numerous useful applications. At present synthetic resins are produced which, weight for weight, can match the strength of steel or duraluminum, but they still have several disadvantages, such as brittleness, for instance, which largely limit their use as substitutes for these metals. But, he went on, there is no scientific reason why these resins could not be greatly improved as the theoretical limit of strength had not nearly been reached.

Referring to news of the development of plastic printing plates in the United States, the chairman of the Star Process Engraving Co., Ltd., Manchester, informs a local paper that England is ahead of the United States in this regard. His company began to make plastic printing plates—"Glacier" and "Ebonoid"—about two years before the war began, with the raw materials coming from France. When France fell, this source of supplies was cut off, but suitable material has been developed in England, and by the end of 1942 about 20,000,000 square inches of plastic plate could be produced.

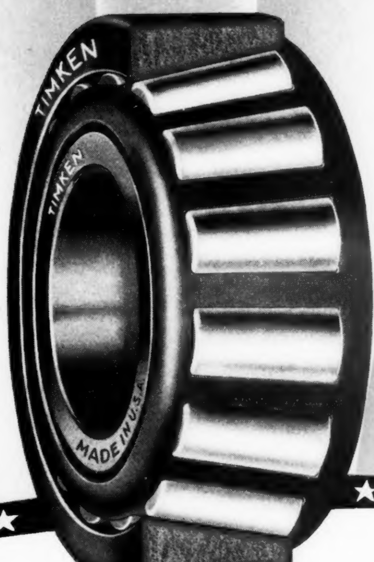
Plastics are also figuring prominently on programs of the Institution of the Rubber Industry. The Manchester Section invited members to attend a Brain Trust meeting March 6 of the Manchester Branch of the Institute of the Plastics Industry. A group of experts was scheduled to answer questions.

At the meeting of the I.R.I. London Section, March 8, J. E. O. Mayne, of Vinyl Products, Ltd., presented "Emulsions Prepared from Polyvinyl Acetate and Its Derivatives." Methods of preparation and properties of polyvinyl acetate, polyvinyl alcohol, and the polyvinyl acetals were covered as well as the preparation of emulsions from these derivatives and their industrial applications. On the same occasion A. Renfrew, of I.C.I. (Plastics), Ltd., and C. F. Flint, I.C.I., Ltd., discussed "Methacrylate and Vinyl Chloride Resin Dispersions" dealing with preparation and uses of dispersions of methacrylate and vinyl chloride resins.

Notes

An Advisory Committee to assist the Rubber Controller on all matters within the scope of the Control has been appointed by the Ministry of Supply, as follows:

Sir Walrond Sinclair, general rubber manufactures; Alexander Johnston, general rubber manufacture and reclaim; W. E. Duck, tires; W. G. Essex, reclaim; G. H. Gyatt, retreaders and authorized tire distributers; L. Pearmaine, Transport & General Workers' Union; T. Williamson, National Union of General & Municipal Workers; H. Eastwood, Amalgamated Society of India Rubber,


TIMKEN
TIMKEN
MADE IN U.S.A.

Cable & Asbestos Workers; J. C. Bennett, dealers; R. S. Thompson, brokers; J. L. Milne, producers.

In the drive for scrap rubber salvage in 1942, 125,000 tons were gathered, about 50% of which is suitable for use in reclaiming or for crumb rubber. This is considered enough for the present, but more rubber must be collected; so a new and intensive drive for salvage is planned for London from June 5 to June 19.

Sir Walrond Sinclair has been elected president of the Federation of British Rubber & Allied Manufacturers' Associations, following the resignation of L. V. Kenward.

Albert W. Spanier, of General Catalytics, Inc., in association with John A. Colman, claims to have developed a method of producing synthetic rubber from turpentine at a cost of 4d. per pound.

The United Kingdom Commercial Corp. is a government-backed organization established at the beginning of the war to carry on trade under emergency conditions for private traders unable to do so because of hostilities. It is reported that this concern has been particularly active in supplying to Russia a vast quantity of goods from Empire sources representing a total value of over £50,000,000 and including thousands of tons of rubber which were imported from Ceylon.

Recent trade reports mention a new material called "Resilitex", said to be a textile fabric with resilience like that of sponge rubber. It is supplied in strips or sheets one inch to 48 inches wide and up to 30 yards long. It is claimed to be suitable as a shock absorbent material, and among its suggested uses are mattresses, shock pads, mountings for instruments, and packing for delicate instruments and medical supplies.

SWEDEN

The Swedish rubber industry and the Cooperative Union have formed a new company to manufacture synthetic rubber from calcium carbide according to the process developed by Prof. The Svedberg, Nobel prize winner and head of the Physical-Chemical Institute of Upsala University. The company is to have a capital of at least 175,000 kronor (about $43,750 at par), and up to 525,000 kronor (about $131,250). The factory and laboratory will be erected near Upsala when suitable sites have been acquired.

In 1939 the country imported 16,450 metric tons of rubber and rubber goods, but since the war very little new rubber has entered Sweden. In consequence Sweden is devoting much attention to synthetic rubber and to the growing of *kok-saghyz*. In addition to the projected factory just mentioned, Sweden has a factory where "Thiokol" type of rubber, called "Modotiol", is produced on a limited scale from sulphite alcohol. Experiments are also in progress to obtain a similar synthetic from sulphite lye.

Work on neoprene has progressed to the stage where it is produced on a semi-industrial scale. It is planned to produce 100 kilograms per hour, and if the Swedish Riksdag approves, a new factory will be started at Ljungaverk, in the Province of Medelpad.

BULGARIA

Kok-saghyz is now also being experimented with in Bulgaria. Initial tests at the Agricultural School in Sofia indicate that the plant will thrive there.

A factory is to be established to produce synthetic rubber from charcoal by a new process, and the government has appropriated 80,000,000 leva for this purpose.

A few years ago the German press printed reports about Bulgarian plans to start its own synthetic rubber factory. A special ruling was to have been made, according chemicals serving as raw materials for the process special preferential treatment under the tariff. It is not known, however, whether that factory ever was built.

LATIN AMERICA

TIRE MANUFACTURE

The manufacture of tires, tubes, and other rubber goods steadily increased in South America up to 1939, but after the outbreak of the war the rate was considerably accelerated. The war, which shut the continent off from various European sources of supply and later also to some extent from North American markets, forced the various republics to rely on their neighbors to an increasing extent for various kinds of rubber goods.

So far Argentina has been the most important supplier of rubber goods, including tires, shoes, heels, hose, belting, toys. Argentina's tire industry is now more than ten years old and includes four manufactories; the output of tires was 250,000 in 1933 and 572,000 in 1939; output of tubes was 375,000 in 1933, against 658,000 by 1939. Data for 1940 and 1941 are not available, but there is good reason to believe that those years showed a considerable expansion in production of these goods. However, since the capture of the chief Far Eastern rubber centers by the Japanese, the imports of rubber as well as of rubber goods have been drastically reduced. Statistics on hand do not give separate figures for crude rubber imports and for manufactures of rubber; but the total amounts for 1942 show a decrease of 72.9% in quantity and of 60.9% in value, as compared with 1941. The decline continued at an even higher rate in the first few months of the current year. Since Argentina produces no raw rubber herself, the reduction in imports of raw rubber has probably been followed by a reduction in manufacture and exports of finished goods.

Brazil is, of course, more fortunately situated as regards crude rubber supplies and can continue to increase the manufacture of rubber goods. This country ranks second among the South American producers of tires; in 1940 the output was 236,553 units, against 65,000 in 1938; output of tubes was 185,156 units in 1940, against 50,000 in 1938, and production has been increasing rapidly since then. In addition to tires and tubes Brazil manufactures comparatively large amounts of other rubber goods, particularly rubber-soled canvas shoes, of which the annual output is said to be about 10,000,000 pairs. A certain amount of these goods is exported to some of the neighboring republics.

Mexico has three tire plants; Venezuela has one with present monthly output of 1,000 tires; the first experimental tires were produced in Peru last February, and Uruguay has a tire factory

that supplies most of the country's needs except in large-sized tires.

MEXICO

A decree, effective April 3, 1943, limits the number of tires and tubes for passenger cars that may be manufactured in Mexico during 1943 to 75% of the number sold in 1941. But the same decree provides for an increase in the manufacture and sale of truck tires and tubes in 1943, amounting to 10% over 1941 sales. Furthermore the Minister of National Economy will fix the sizes and kinds of tires and tubes that each factory may produce.

PANAMA

In cooperation with the United States, Panama is organizing a program which, when in full swing, may bring the annual output of rubber from this country to about 400 tons. Some rubber has been shipped to the United States by air.

In relation to its size, Panama has more rubber trees than any other Caribbean area. The trees are chiefly *Castilloa* which, unlike *Hevea*, can only be tapped about twice a year. An American technician, George Seeley, has been instructing Panamanians in the most efficient methods of tapping the trees and caring for them.

COSTA RICA

The stimulating effect of the activities of the United States Rubber Reserve Co. on rubber production in Costa Rica is to be seen from the 1942 figures for exports from that country. Whereas only about 10 tons of rubber were sent out in the first half of 1942, shipments jumped to 215 tons in the second half of the year, the period during which Rubber Reserve began operating. These results appear to justify the local representative's *estimate* of 600 tons of rubber exports for 1943.

COLOMBIA

The almost inaccessible jungles of Colombia are said to be now supplying two tons of wild rubber daily. This feat has become possible because of the airplane which carries the rubber from the jungle and also brings food and other necessaries to the thousands engaged in the collection of rubber.

NOTES

Exports of balata from British Guiana increased from 379,165 pounds in 1940 to 659,190 pounds in 1941. Practically all of the 1941 shipments went to the United Kingdom.

Honduras, which only recently began to exploit its rubber resources, has shipped more than 100,000 pounds of high-grade rubber to the United States in the past five months.

FAR EAST

MALAYA

According to German press reports, Japan is cutting down rubber trees in Malaya and intends to plant cotton in their place. The rubber industry will be continued as a private enterprise, but will receive financial and scientific aid from the government. So far the only scientific activities reported in regard to rubber have been experiments to produce fuel oil from rubber.

AUSTRALIA

Australia plans to expand her chemical industry chiefly with an eye to war needs, and an Industrial Chemical Committee has already been appointed by the Australian Government. A local chemical company has been producing synthetic phenol for the last six months, it is reported; raw materials are entirely of domestic origin.

CEYLON

The important effect of atmospheric temperature on the incidence of *Oidium* leaf disease in Ceylon was again demonstrated in 1941, notes the Botanical and Mycological Department of the Rubber Research Scheme, Ceylon, in its report for 1941. In the low-country, day and night temperatures were unusually high during February and the first half of March, when the disease was hardly noticeable. But during the second half of March the weather was wet and cooler, and late wintering trees were affected. Higher-lying estates reported that below the altitude of 1500 feet, the attack was relatively light, but above that level defoliation was extensive as usual. An experiment is being conducted to determine the resistance of trees to *Oidium* in an effort to develop disease-resistant trees, and a "museum" collection of clones has been established on Kepitigalla Estate, Matale, at an elevation of about 1500 feet; so far more than 37 clones have been planted for this purpose.

Studies on clone and seedling families were continued; 95 new clones were established from legitimate seedlings raised from hand-pollinations carried out in 1939; tapping was started on 17 new clones developed from Ceylon mother trees, as well as on 114 clones derived from Prang Besar Isolation Garden seedlings, and some of the latter are considered very promising.

Results of commercial tapping of budded areas on estates on the whole indicated satisfactory yields, though in some cases the rate of increase in the second tapping year was disappointing.

At the Nivitigalakele experimental garden seedling trees from isolation seed gardens on Prang Besar Estate, Malaya, and Tjikadoe, Java, were tapped for the second and third year respectively. While many Ceylon estates have planted Prang Besar I. G. seed in recent years, the trees from this type of seed planted at the above-named experimental garden are thought to be the only ones that have so far come into tapping; it is therefore rather discouraging that the yields so far have been disappointing and have hardly come up to the standards of good clones of the same age and girth. However it is thought that the unfavorable weather conditions which frequently interfered with tapping in 1941 may to some extent have been responsible for the poor showing which the trees made.

Work on breeding included a considerable number of artificial pollinations in which the parents were budded trees of high-yielding Ceylon clones. Altogether 14,271 pollinations were made, and 536 flowers set seed, but in the end only 443 seedlings were ob-

(*Continued on page 304*)

Editor's Book Table

BOOK REVIEWS

"A. S. T. M. Standards on Rubber Products." Prepared by A. S. T. M. Committee D-11 on Rubber Products. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. February, 1943. Paper, 6 by 9 inches, 304 pages. Price $1.75.

This latest edition of "A. S. T. M. Standards on Rubber Products," includes not only new specifications and additions to former regular specifications, but, what is more significant, also includes eight emergency alternate specifications which it has been found necessary to develop to conserve rubber. All of the emergency alternate specifications apply to insulated wire and cable and permit use of compounds of lower new rubber content. The May issue of the *A. S. T. M. Bulletin* also reports further specifications of this type (ES-28) for chloroprene sheath compound for electrical insulated cords and cables and (ES-30) for the same material when extreme abrasion resistance is not required. These specifications, which are not included in this February, 1943, volume, were developed since the WPB recently advised the wire industry that the use of rubber for jackets will be prohibited and that neoprene would be allocated.

A total of 41 specifications on general methods, rubber hose and belting; rubber gloves, matting, tape; insulated wire and cable; and latex, rubber cements, sponge and hard rubber products are given. Specification D676—42T on Method of Test for Indentation of Rubber by Means of the Durometer (Tentative) is included for the first time although the method was accepted by the Society at the annual meeting in June, 1942. Specification D471—43T on Changes in Properties of Rubber and Rubber-Like Materials in Liquids, Tests for (Tentative), replaces D471—40T on the same subject. An alternate method for determining increase in volume by linear measurement and specifications for standard control medium which gives aniline point and Saybolt viscosity for the medium are additions found in the new specification.

The appendix contains the usual bibliography on sources of information on properties and testing of rubber and a list of the personnel and subcommittees of Committee D-11.

"Adhesives." Felix Braude. Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 1943. Cloth, 5¼ by 8½ inches. Index. 168 pages. Price $3.

Presented from the practical point of view with a minimum of theoretical discussion, this book was designed primarily for the producer, consumer, or salesman. The theory and the application of adhesives and tests for adhesives are first discussed; then the major raw materials, such as flour, dextrins, casein, gums, resins, etc., are covered as to source and general chemical classification. The chapters on the different types, which include one on rubber dispersions and solutions as adhesives and one on rubber adhesives (solvent cements), contain many examples of formulas for specific applications. Reasonably detailed mixing instructions are supplied in most cases, and a chapter on equipment for the manufacture of adhesives is also included.

"Noxious Gases and the Principles of Respiration Influencing Their Action." Second and Revised Edition. Yandell Henderson and Howard W. Haggard. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1943. American Chemical Society Monograph Series. Cloth, 6 by 9 inches, 294 pages. Bibliography and subject index. Price $3.50.

Volatile substances are used in modern industry in enormous quantities. They occur as raw materials, as products, and as agents of manufacture, and the gas hazards of modern industry and the defenses against them are extremely important. This book deals primarily with the special features of toxic action dependent upon volatility. Only the gases which occur in industry are dealt with in this volume; their use in war is not discussed.

The book was written for the practical use and information of chemists, engineers, and others engaged in industry; therefore a

rather full description of the function of respiration has been included. Of special note in this connection are the chapters on resuscitation and the prevention of poisoning by noxious gases.

Gases are classed as irritants, asphyxiants, and volatile drugs and drug-like substances and are discussed in detail in various chapters according to this classification. For quick reference a table of noxious gases listed according to chemical composition and classified according to their action of nearly 200 gases is included. This table refers to the chapter in the book where detailed information may be found.

In these days of the introduction into the rubber industry, of new chemicals, many of which are volatile in character, and new processes, and because of the use of new personnel in old processes where volatile substances are used, this book should be of considerable value.

NEW PUBLICATIONS

"The Compounding of Buca with Synthetic Rubber." Moore & Munger, 33 Rector St., New York, N. Y. 20 pages. The major portion of this booklet is concerned with some interesting observations on the compounding of GR-S for tires. The importance of low mill temperatures and thorough dispersion of sulphur is emphasized. In order to make a tire that would have a good flex life in the tread, together with a minimum of chipping and also to obtain in both the tread and carcass as high an elongation as possible after heating, tread and carcass stocks of a Shore hardness of 50 were used. Buca, a highly refined clay pigment developed mainly for compounding synthetic rubbers, was found suitable in this connection. Details of compounding and tire building and also the results of wheel and road tests are reported. Included also are results of the use of Buca in compounding two types of Buna S for insulation for CV processing and also results in compounding Neoprenes GN, CG, CN, Hycar OR 15, and Perbunan.

"The Five Commercial Types of Synthetic Rubber." United States Rubber Co., Synthetic Rubber Division, 1230 Sixth Ave., New York, N. Y. 40 pages. This well-written and well-illustrated publication gives in simple language the essential facts of the development of synthetic rubbers with special reference to those which at present are the five principal commercial types. A table of comparative properties of natural and these synthetic rubbers is followed by a brief treatment of each of these five types, i.e., Buna S, Buna N, neoprenes, Butyl and the "Thiokols." The methods of manufacture of Bune S rubber are told in a general way, and the remainder of the bulletin is given over to a discussion of the elementary chemical compositions and physical and chemical properties of the monomers and related chemical substances used to make the synthetic rubber polymers. The question of molecular composition of natural and synthetic rubber polymers and the processes of vulcanization and oxidation of rubbers are also covered. Included is a glossary of terms used in discussing rubber and plastic materials and processing. The booklet, which has had limited distribution to government agencies and allied industry, is now generally available and should be very useful in educating the increasingly larger portion of the public requiring information on this subject.

"Turgum." J. M. Huber, Inc., 460 W. 34th St., New York, N. Y. 10 pages. The use of Turgum, refined crude gum turpentine, as a plasticizer and tackifier for Buna S rubber is reported in this publication. A comparison of compounds in which no softener, coal tar softener, and Turgum were used is given to show the advantages of Turgum in the production of high tensile, high elongation, good resistance to heat, and remarkable resistance to cut growth. A comparison of the effect of Geer oven aging on compounds containing Turgum and a coal tar softener appears in another table, and a comparison of Turgum and eleven softeners for tensile, elongation, modulus at 400%, and tear resistance concludes the booklet.

"Neoprene Latex Type 571." Report No. 43-2. B. Dales, H. H. Abernathy, and R. H. Walsh. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 48 pages. In this bulletin the general properties of this Type 571 neoprene latex and the films made from it, compounding, processing, and uses are discussed. This synthetic latex is described as being suitable for practically all applications for which natural rubber latex has been used. The bulletin is divided into three parts: General Description and Compounding Principles, which covers such information as a recommended basic compound and the effect of the various compounding ingredients on properties of the final product; The Uses of Neoprene Latex Type 571, which includes suggested compounds for many uses; and Preparing and Using Neoprene Latex Compounds, which gives some details of the emulsions and pastes necessary for compounding and also describes different dipping, molding, impregnating, and coating methods used to manufacture products from this latex. An index is provided.

"Mixing Schedules for 'Thiokol' FA Compounds." Technical Service Bulletin #5. Thiokol Corp., Trenton, N. J. 4 pages. Details of mixing procedure with a typical compound are given in this bulletin. Both open mill and Banbury mixing are covered, and batch sizes for open mills from 12 to 84 inches are given as is procedure for order of addition of ingredients of typical compound. Similar treatment is given Banbury mixing procedure.

"Hercules Chemist." No. 12. Hercules Powder Co., Wilmington, Del. 32 pages. Information on the use of various grades of rosin and hydrogenated rosin (Staybelite) in soap making, more data on ethyl cellulose as regards moisture and heat resistance, hardness, electrical characteristics and molding qualities, and a brief description of the use of the Hercules photoelectric color grader for rosin are presented in this bulletin. Continuing the theme of portraying the company's part in making its chemical products more helpful in the war effort, considerable discussion is also devoted to the use of Abalyn and Hercolyn, classed as asphalt modifiers and useful in making today's limited variety of asphalts more applicable for many requirements.

"Okonite Insulation." H. C. Crafton, Jr., and E. D. Youmans. Research Laboratory, The Okonite Co., Passaic, N. J., 32 pages. This very well-done bulletin describes with numerous illustrations the essential features of the manufacture of vulcanized rubber insulation as carried out by the Okonite company. The value of Up-River Fine Para rubber for high-grade insulations for wires and cables is discussed, after which the milling and compounding of this rubber for insulation uses are covered. Calendering and the Okonite "strip process" of covering electrical conductors follow together with discussion of the use of "Okoloy" lead coating for protection of the copper conductor. The use of the strip covering process for applying neoprene jackets, called "Okoprene", is also mentioned.

A considerable portion of the bulletin is devoted to a treatment of the discrepancy between accelerated aging tests on rubber insulation compounds and the results obtained under service conditions. The importance of proper vulcanization and the changes that take place in classification of compounds on short and long periods of aging in the oxygen bomb, with special reference to under- and over-vulcanized compounds, are described and illustrated. The fact that the mechanical absorption of water in rubber insulations bears no direct relation to electrical properties in wet service conditions is the subject of the concluding section of the bulletin, which in this connection compares the moisture absorption as well as aging properties of Up-River Fine Para rubber and deproteinized rubber.

"'Thiokol' FA—Neoprene GN Blends." Technical Service Bulletin #7. Thiokol Corp., Trenton, N. J. 4 pages. Prepared in order to aid the compounder in meeting specifications relating to aromatic blend fuels, this bulletin gives data on blends of "Thiokol" FA and Neoprene GN with special reference to per cent. volume increase in certain of these fuels. A summary of miscellaneous data on other items from data not reproduced in this bulletin is included. Graphs on changes in compression set, volume swell in 813 fuel, and tensile strength with the various blends conclude the bulletin.

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"Chat Number 29—Easy Processing Channel Black." Binney & Smith Co., 41 E. 42nd St., New York, N. Y. 6 pages. This booklet presents data from an earlier publication on the use of Micronex W-6 and Standard Micronex channel blacks in a natural rubber tread-type formula and new data on the use of these two blacks in the same type of formula based on Buna S rubber in order to show the difference between these two types of black and also the degree of softness of these blacks as compared with the extra-reenforcing or hard type of black. Data to show the advantage of Micronex W-6 black in blow-out resistance as measured by means of the Detrition machine are presented.

"'Thiokol' FA — Butadiene Acrylonitrile Copolymer Blends." Technical Service Bulletin #4. Thiokol Corp., Trenton, N. J. 4 pages. This bulletin gives data on physical properties of "Thiokol" and Buna N blends, including information on compression set and solvent resistance. Processing of these blends is stated as excellent, and it is also said that blends of these two copolymers resist solvents better than either copolymer alone.

"Rubber Chemicals Literature." Report No. 42-5. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 16 pages. A subject index of all du Pont rubber chemicals literature issued during 1940, 1941, and 1942, arranged in alphabetical order and including report number and page in the report in which the subject is discussed, is covered in this booklet.

"What Now?" Dispersions Process, Inc., 1230 Sixth Ave., New York, N. Y., 4 pages. **"Index to A-S-T-M Standards Including Tentative Standards."** December, 1942. American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. 198 pages. **"How to Make Your Safety Equipment Last Longer."** Mine Safety Appliances Co., Pittsburgh, Pa. 32 pages. **"Counterattack!"** Automotive Safety Foundation, Washington, D. C. 24 pages. **"Handbook of Emergency War Agencies."** March, 1943. Office of War Information, Washington, D. C. 143 pages. **"Handbook for the Welding and Cutting Operator."** The International Acetylene Association, 30 E. 42nd St., New York, N. Y. 20 pages. **"Some Wartime Activities of Underwriters' Laboratories, Inc."** Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 12 pages. **"Ways of Dealing with Absenteeism as a Part of the War Production Drive."** War Production Board, Washington, D. C. 27 pages. **"Controlling Absenteeism."** United States Department of Labor, Washington, D. C. 57 pages. **"Manual of Industrial Nutrition."** United States Department of Agriculture, Washington, D. C. 24 pages. **"Agricultural Machinery Industry."** 52 pages. E. W. Axe & Co., Inc., 730 Fifth Ave., New York, N. Y.

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VITAL COMPOUNDING INGREDIENTS FOR SYNTHETIC RUBBERS. H. Barron, *Rubber Age (London)*, Mar. 1943, pp. 12-13.

RUBBER IN RELATION TO THE WAR EFFORT. The Role of the Synthetic Product. N. G. Hiscox, *India Rubber J.*, Mar. 20, 1943, pp. 3-4; Mar. 27, pp. 11-13; Apr. 3, pp. 5-7. (Conclusion.)

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A NOVEL TEST METHOD FOR THIN-WALLED ARTICLES. W. J. Genth, *India-Rubber J.*, Apr. 17, 1943, p. 12.

CLASSIFICATION OF PLASTICS (including Rubber). W. H. Stevens, *India-Rubber J.*, Apr. 24, 1943, pp. 5-6.

LABOR RELATIONS. L. V. Kenward, *Rubber Age (London)*, Apr., 1943, pp. 33-34. (To be continued.)

Application of Statistical Methods to Experimental Work in the Rubber Industry. T. Halse, *Trans. Inst. Rubber Ind.*, Feb., 1943, pp. 190-206.

Brass Plating. W. A Gurney, *Trans. Inst. Rubber Ind.*, Feb., 1943, pp. 207-11.

X-Rays and Rubber. C. J. Birkett Clews, *Trans. Inst. Rubber Ind.*, Feb., 1943, pp. 225-30.

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Wide Base Rims. M. G. Anderson, *Trans. Inst. Rubber Ind.*, Feb., 1943, pp. 238-44.

Hydrocarbon Extenders. L. Merrick, *India-Rubber J.*, Apr. 3, 1943, pp. 13-15.

The Interaction Between Rubber and Liquids. III. The Swelling of Vulcanized Rubber in Various Liquids. G. Gee, *Rubber Chem. Tech.*, Apr., 1943, pp. 263-67.

Equations of State for Natural and Synthetic Rubber-Like Materials. I. R. L. Anthony, R. H. Caston, and E. Guth, *Rubber Chem. Tech.*, Apr., 1943, pp. 297-309.

Specific Heat of the Synthetic Rubber Hycar-OR from 15° to 340° K. N. Bekkedahl and R. B. Scott, *Rubber Chem. Tech.*, Apr., 1943, pp. 310-17.

The Bacterial Oxidation of Rubber. C. E. ZoBell and C. W. Grant, *Rubber Chem. Tech.*, Apr., 1943, pp. 381-82.

Experiments on the Preparation of Transparent Vulcanized Rubbers. E. B. Johnson and J. R. Scott, *Rubber Chem. Tech.*, Apr., 1943, pp. 445-52.

Textiles in Armor. F. R. Price, *Du Pont Magazine*, Apr.-May, 1943, pp. 3-8, 14.

Industrial Hygiene of Rubber Materials. F. A. Van Atta and A. M. Noyes, *Canadian Chem. Proc. Ind.*, Apr., 1943, pp. 183-85, 190.

A Method of Testing the Elasticity of Synthetic Rubbers at Low Temperatures. G. D. Kish, *Rubber Age (N. Y.)*, May, 1943, pp. 131-35.

Wool Felt as a Substitute for Rubber. W. Colwell, *Rubber Age (N. Y.)*, May, 1943, pp. 136-38.

An Improved Procedure for Testing with the Pusey and Jones Plastometer. R. E. Morris and R. E. Harmon, *Rubber Age (N. Y.)*, May 1943, pp. 139-40.

Carbon Tetrachloride—from the Health Viewpoint. H. P. Quadland, *Rubber Age (N. Y.)*, May, 1943, pp. 141-42.

Better Management for the Rubber Factory. VI—Taxes. A. Roberts, *Rubber Age (N. Y.)*, May, 1943, pp. 143-45.

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The Rubber Molecule: Its Size and Significance. G. Gee, *India-Rubber J.*, May 1, 1943, pp. 3-6; May 8, pp. 11-12, 14-15. (Conclusion.)

Vinyl Resins in War and Peace. II. R. B. Akin, *Chem. Ind.*, May, 1943, pp. 599-603.

Making Wartime Tennis Balls at A. G. Spalding & Bros. *Sport. Gds. Dealer*, May, 1943, pp. 94-95.

Spain

To conserve old rubber the Spanish Government has issued orders whereby certain rubber goods, including tires, may not be sold unless the purchaser turns in the article to be replaced. Recently the ruling was extended to apply also to rubber-soled alpargatas.

Flash! Rubber Division Fall Meeting Transferred

It has been announced that the fall meeting of the Division of Rubber Chemistry, American Chemical Society, will be held in New York, N. Y., at a date to be decided upon later, though probably it will be early in October. The meeting will be separate from that of the general meeting of the A. C. S. which is scheduled to be held in Pittsburgh. The reason for the change is the lack of adequate facilities in Pittsburgh.

Patents and Trade Marks

APPLICATION

United States

2,316,941. Oil Retaining Device to Seal a Space between a Housing and a Shaft, Including a Molded Pressure Ring of a Flexible Oil-Resistant Synthetic Rubber Compound. H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,317,034. Piston Ring Adapted to Roll in Sealing Engagement between a Piston and Cylinder; the Ring Is of Rubber in Which a Torsional Strain Has Been Set up to Destroy the Tendency of the Rubber Ring to Assume a Normal Position of Equilibrium When Rolled on a Cylindrical Surface Frictionally Embraced by the Ring. A. A. Dalkin, assignor to A. Dalkin Co., both of Chicago, Ill.

2,317,076. Asphaltic Composition Battery Box Structure with an Acid-Resistant Surface Coating Comprising a Homogenous Mixture of a Copolymer of Vinyl Acetate and Vinyl Chloride together with Polymerized Coumarone. J. J. Mick, Needham, and R. E. McCurdy, Wellesley, both in Mass., assignors to B. F. Goodrich Co., New York, N. Y.

2,317,144. Water Eliminator Including an Absorbent Roller Having a Hard Cylindrical Core Surrounded by a Layer of Sponge Rubber. R. S. Grant, Dunedin, Fla., assignor to Food Machinery Corp., San Jose, Calif.

2,317,255. Toy Having a Length of Rubber Tubing with Flattened Walls Spaced Apart to Permit a Flow of Air therebetween. O. B. Crowell, assignor to Viceroy Mfg. Co., Ltd., both of Toronto, Ont., Canada.

2,317,398. Railway Truck Bolster Having a Downwardly Facing Recess with a Flat Pad of Rubber-Like Material in the Bottom of the Recess and a Ring of Rubber-Like Material Mounted on the Side of the Recess below the Pad. K. F. Nystrom, Milwaukee, Wis., E. S. Beckette, East St. Louis, Ill., and V. L. Green, Milwaukee, Wis., Beckette assignor to General Steel Castings Corp., Granite City, Ill.

2,317,500. Bracket for Securing an Engine to an Engine Support for Limited Resiliently Resisted Freedom of Movement of the Engine Relative to the Supports, Including a Flat Rubber Cushion Bonded to Each Side of an Included Core Element. J. M. Tyler, West Hartford, assignor to United Aircraft Corp., East Hartford, both of Conn.

2,317,636. Automobile Wheel with Dual Tires and a Tire Inflater Mounted on Its Hub so as to Rotate therewith. C. W. Parker, Dobbs Ferry, N. Y.

2,317,658. Goggles, Including a Flexible Rubber Body Portion for Engaging the Face about the Eyes. J. W. Welsh, Providence, R. I., assignor to Welsh Mfg. Co., a corporation of R. I.

2,317,661. Cosmetic Applicator, Including a Pad of Cured Rubber Latex Having Minute Communicating Pores of Varying Sizes Distributed therethrough. C. E. Zimmerman, Chicago, Ill.

2,317,730. Laminated Pliable Sheet Material Adapted to Be Folded and Made into Bags for Holding Brine, Including a Sheet of Paper Coated with an Elastic Composition Containing a Major Proportion of Rubber and a Minor Proportion of Wax. W. C. Calvert, assignor to Marbon Corp., Gary, Ind.

2,317,911. Rubber Tires Containing, as the Reenforcing of an Oriented Synthetic Linear Polyamide Element therein, a Reenforcing Structure Consisting of Mono-Fil. G. P. Hoff, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,317,912. Pneumatic Tire, Including Tread and Sidewall Portions of Rubber Composition and a Carcass Composed of a Plurality of Plies of Strain Resisting Textile Elements; at Least One of the Intermediate Plies of Textile Elements in the Region Adjacent the First Ply Has a Higher Rupture Resistance Than Either the First or Outer Ply. H. S. Howe, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,317,987. Surgical Device, Including a Relatively Long Cylindrical Member of Small External Diameter Formed from a Thermoplastic Mass so as to Be Externally Smooth, a Substantial Proportion of the Mass Comprising a Copolymer of Vinyl Resins. V. J. Flynn, Palisades Park, assignor to Wardlyn Corp., Ridgefield, both in N. J.

2,318,016. Flexible Polishing Disk, Including Windings Impregnated with a Flexible Rubber Composition. C. F. Schlegel, Brighton, assignor to Schlegel Mfg. Co., Rochester, both in N. Y.

2,318,301. Bullet Resisting Armor, Including a Vulcanized Rubber Composition Bonded to and Forming a Yieldable Embedment for Metal Strips, and a Layer of Rubber Composition Secured Directly to the Back of the Embedment for Forming a Cushion for the Strips. E. Eger, Grosse Pointe Park, Mich., assignor to United States Rubber Co., New York, N. Y.

2,318,340. The Combination Including an Automotive Vehicle Having Rubber Tires Acting as Electrical Resistors between the Vehicle Body and the Road, and a Strip of Flexible, Rubberized Material Rigidly Attached to the Vehicle Body. S. P. Thacher, Grosse Pointe, and G. G. Havens, Detroit, both of Mich., assignors to United States Rubber Co., New York, N. Y.

2,318,377. A Combination Including a Curing Mold for Inner Tubes or Other Inflatable Rubber Articles Provided with Rubber Valve Stems Having Threaded Portions. J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.

2,318,441. Non-Static Belting Having a Body Including Covers of Electro-Conductive Rubber Bonded to Both Faces of the Body, and Electro-Conductive Means Having at Each Location a Strip of Electro-Conductive Rubber. J. C. Walton, Newton Center, and G. E. Hall, Dedham, assignors to Boston Woven Hose & Rubber Co., Cambridge, all in Mass.

2,318,457. Reenforced Rubber Article Having Embedded Therein a Reenforcing Element of Several Untwisted Viscose Threads Braided together; the Composite Element Is Characterized by Increase in Denier without Loss of Tensile Strength. A. C. Bouhuys, assignor to American Enka Corp., both of Enka, N. C.

2,318,492. Inflatable Air Mattress Formed of a Pair of Rubber Sheets Sealed together at the Edges and Having Top and Bottom Sheets Connected on the Inner Side of the Mattress by a Plurality of Parallel-Space Flexible Rubber Strips. J. H. Johnson, Toronto, Ont., Canada.

2,318,498. Shielded Storage Battery Plate, Including a Pasted Grid Having Slots Extending therethrough, Perforated Hard Rubber Sheet Material, Surrounding the Grid, and Rubber Strips in the Slots Extending from One Face of the Rubber Sheet Material. A. W. Keen, Packanack Lake, N. J., assignor to United States Rubber Co., New York, N. Y.

2,318,547. Golf Ball with a Cover Comprising a Mixture of Rubber and a Polyvinyl Resin. W. E. Welch, Springfield, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,318,682. Seamless Tubular Handle-Grip Member, Including a Substance Having the Resilient Deformability of Fully Vulcanized Soft Rubber. T. L. Fawick, Akron, O.

2,318,841. Article of Manufacture for Use in Upholstery, Including a Relatively Thin Flexible Sheet-Like Member of Rubber or the Like Having an Angularly Disposed Integral Flange along at Least One Edge thereof. H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,318,992. Track for Self-Laying Track Vehicle, Including a Body of Rubber-Like Material. H. Gray, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,319,027. Universal Joint Structure for Coupling Shafts End to End Subject to Relative Angular Movements, Including a Soft Rubber Cylindrical Tubular Housing Sleeve of Substantial Wall Thickness. E. S. Aker, Belleville, N. J.

2,319,085. Raincoat, Including an Outer Shell of Rubber Coated Waterproof Fabric Having All Outside Seams United Entirely with a Rubber Bond. T. F. Plant, Mishawaka, Ind., assignor to United States Rubber Co., New York, N. Y.

Dominion of Canada

411,703. Surgical Truss, Including a Substantially U-Shaped Resilient Member Adapted to Encompass Part of the Body, and a Pad Secured to the Member with a Metal Plate and a Soft Rubber Member Molded around the Plate. J. W. Dobbs, Birmingham, Ala., U. S. A.

411,713. Aerial Bomb, Including a Rubber Cap Substantially Enclosing the Nose Portion of the Bomb and Disposed in Interlocking Engagement with the Housing and the Bomb Casing. J. Imber, Farnham Common, Buckinghamshire, England.

411,746. Structure in Sheet Form, Including a Plurality of Wire Ropes or Cords Arranged Side by Side and Embedded in a Body Formed of a Vulcanized Rubber Composition. British Ropes, Ltd., Doncaster, York, assignee of J. Smith, Retford, Nottingham, both in England.

411,858. Tire Cords of Improved Strength, Including Cellulose Yarns Having Incorporated therein a Hygroscopic Liquid Selected from the Group Consisting of Polyhydric Alcohols, Their Partial Ethers, and Partial Esters. C. Dreyfus, New York, N. Y., U. S. A.

411,864. Life Jacket Formed of Two Sheets of Rubber Material Secured together Face to Face with Portions Unsecured Forming Inflatable Chambers and Other Portions Unsecured Forming an Open Channel Connecting Several Chambers. J. H. Johnson, Delaware, O., U. S. A.

411,958. Tie Rod Joint Construction, Including an Elliptical Block of Rubber Seated in a Bore and Having Ribs Seated in Recesses; the Block of Rubber Has a Cylindrical Bore through the Center. Thompson Products Inc., Cleveland, O., assignee of G. H. Hufferd, Detroit, Mich., both in the U. S. A.

412,013. Rubber Sealing Member for Use in a Fluid Seal between a Shaft and a Housing, with a Bearing for the Shaft Supported by the Housing. M. Katcher, New York, N. Y., U. S. A.

412,086. Cushion Structure, Including a Deck of Rubber and Fabric Intimately Combined. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. W. Blair, J. F. Schott, and W. E. Faulk, co-inventors, all of Mishawaka, Ind., U. S. A.

412,149. Universal Joint of the Four-Trunnion Type, Including a Resilient Rubber-Like Sealing Ring Means Retained within and by the Sleeve Portion of the Ferrule. Universal Products Co., Inc., assignee of G. E. Dunn, both of Dearborn, Mich., U. S. A.

412,187. Pneumatic Tire Casing Having a Carcass Substantially Arcuate Cross-Sectionally When the Tire Is Inflated and Unrestrained against Outward Expansion. P. E. Hawkinson, Minneapolis, Minn., U. S. A.

412,307. Spongy Rubber Cushion or Pillow, Including a Body Having a Plurality of Internally Located, Substantially Horizontal Elongated Cylindrical Cavities Extending Transversely of the Pillow Parallel to Each Other and Separated from Each Other by Thin Walls. United States Rubber Co., New York, N. Y., assignee of J. F. Schott, Mishawaka, Ind., both in the U. S. A.

412,321. Drier for Bobbins of Yarn, Including a Clamping Frame Having a Rubber Seat to Receive a Bobbin, and a Clamp Mounted on the Frame with a Rubber Pad thereon. H. Dreyfus, London, assignee of W. I. Taylor, Spondon, both in England.

412,344. Surgical Sponge, Including a Rounded Body of Synthetic Resilient Sponge Material. H. M. Kirschbaum, Detroit, Mich., U. S. A.

412,359. Preserving Sealer Cover, Including an Annular Shaped Plate Element, a Lower Clamping Annular Shaped Plate, and a Rubber or Other Resilient Composition Disk Firmly clamped between Upper and Lower Plates. E. R. Wright, Airdrie, Alta.

412,388. Door Holder or Like Article, Including a Block of Rubber Having an Interior Socket of Rounded Conformation with a Flared Entrance Portion Leading thereto from One Face of the Block. Bassick Co., Bridgeport, assignee of A. Claud-Mantle, Trumbull, both in Conn., U. S. A.

United Kingdom

551,657. Tires. Firestone Tire & Rubber Co.

551,740. Webbing Straps. Dunlop Rubber Co., Ltd., and L. Harral.

552,097. Fabrics Comprising Synthetic Linear Polyamide Fibers. E. I. du Pont de Nemours & Co., Inc.

552,142. Water Insoluble Monoazo Dyestuffs. E. I. du Pont de Nemours & Co., Inc.

552,144. Surface-Coated Rubber Products. E. I. du Pont de Nemours & Co., Inc.

MACHINERY

United States

2,317,890. Vulcanizer for Rubber Footwear and the Like, Including an Outer Shell, an Inner Shell Having Its Walls Spaced from the Outer Shell to Form an Air Passage between; the Inner Shell Forms a Vulcanizing Chamber in the Interior thereof. F. C. Dawson, Canton, assignor to B. F. Sturtevant Co., Hyde Park, Boston, both in Mass.

2,318,310. Full-Circle Tire-Tread Vulcanizer, Including Lower and Upper Press Heads of Which the Upper Head Is Pivoted on the Rear of the Lower Head for Swinging Movement in a Vertical Plane. J. C. Heintz, Lakewood, O.

2,318,779. Tire Repairing Apparatus, Including a Support, an Arcuate Tire Supporting Plate Carried by the Support and Having a Tire Engaging Surface. N. G. Hovlid, Torrance, Calif.

2,319,042. Machinery and Process for Converting Sponge Rubber Compound and Non-Blowable Unvulcanized Rubber into Uniformly Vulcanized Sponge Rubber Having at Least a Partial Skin of Solid Rubber Bonded thereto, Which Includes Simultaneously Withdrawing the Compound and Plural Webs of the Unvulcanized Rubber from Separate Sources of Supply thereof. L. H. De Wyk, Jr., Ansonia, assignor to Sponge Rubber Products Co., Shelton, both in Conn.

United Kingdom

552,515. Machines for Mixing, Masticating, Breaking down or Reclaiming Rubber Products, or for Mixing Rubber Compositions or Plastics

and the Like. D. Bridge & Co., Ltd., and J. Brown.

PROCESS

United States

2,317,586. **Producing a Solid Rubber-Like Product from a Material Selected from the Group Consisting of Cardanol, Hydrocarbon Ethers of Cardanol and Hydrocarbon Ethers of Cashew Nut Shell Liquid, Including Treating the Material with Substantially Anhydrous Hydrofluoric Acid.** S. Caplan, assignor to Harvel Corp., both of New York, N. Y.

2,318,693. **Shredding Non-Porous Rubber-Like Material Taken from the Class Consisting of Crude Rubber, Compounded Rubber, Vulcanized Rubber, Unvulcanized Rubber, Reclaimed Rubber, Polymerized Chloroprene and Polymerized Isoprene.** W. J. Joyce and H. D. Geyer, Dayton, O., assignors to General Motors Corp., Detroit, Mich.

Dominion of Canada

412,157. **Making Rubber Hydrochloride Film by Dissolving in a Rubber Hydrochloride Cement More Wax Than Is Compatible with the Rubber Hydrochloride, Casting the Resulting Cement to Form a Film therefrom and Evaporating Solvent so as to Produce a Film Which Has a Coating of Wax on the Surface from Which the Solvent Has Evaporated.** Wingfoot Corp., Wilmington, Del., assignee of J. E. Snyder, Akron, O., both in the U. S. A.

CHEMICAL

United States

2,316,921. **Preparing Acetals of Polyvinyl Alcohol by Causing an Aldehyde Containing from 2 to 18 Carbon Atoms to Act upon Polyvinyl Alcohol.** A. Weihe, Bad Soden in Taunus, and F. Herrlein, Frankfort-on-the-Main-Hochst, both in Germany, assignors, by mesne assignments, to General Aniline & Film Corp., New York, N. Y.

2,316,949. **A Method of Increasing the Plasticity of a Rubbery Polymer Prepared by the Polymerization of a Material Consisting Predominately of a Conjugated Butadiene Hydrocarbon, Which Comprises Treating the Rubbery Polymer with an Aryl Mercaptan.** B. S. Garvey, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,317,116. **Preparing Resins Comprising Reacting Cashew Nut Shell Liquid with an Aldehyde in the Presence of a Benzene Sulphonic Acid and a Benzene Sulphonyl Chloride.** J. L. Sheridan, Long Island City, assignor to Custodis Construction Co., Inc., New York, both in N. Y.

2,317,130. **Obtaining a Synthetic Resin by Polymerizing an Aromatic Diamine from the Group Consisting of the Phenylene, Toluylene, Diphenyl, and Naphthalene Diamines, in Which All of the Amino Groups Contain as a Substituent a Group from the Class Consisting of**

$-\overset{O}{\overset{\|}{C}}-\overset{CH_3}{\overset{|}{C}}=CH_2$ **and** $-\overset{O}{\overset{\|}{C}}-CH=CH_2$ **Groups.** L. Coes, Jr., Brookfield, and C. E. Barnes, Worcester, both in Mass., assignors by mesne assignments, to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,317,137. **Preparing a Polystyrene Plastic Characterized by a Nacreous Sheen, which by Forming a Plastic Mixture Essentially Consisting of 100 Parts of Polystyrene and 0.5-10.0 Parts of an Aluminum Salt of an Aliphatic Acid of 12-18 Carbon Atoms, Inclusive, and Then Applying an Orienting Force; Enough Aluminum Salt Is Employed to Give the Plastic a Nacreous Sheen.** D. A. Fletcher, Bloomfield, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,317,138. **Granular Polymerization of an Ethenoid Monomer from the Group Consisting of Vinyl Esters, Styrene, and Esters of Acrylic and Methacrylic Acids.** D. A. Fletcher, Bloomfield, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,317,149. **Manufacture of Polyvinyl Acetate in Finely Divided Form by Coating the Particles with Sebacic Acid before Drying Them and Then Drying Them at an Elevated Temperature.** T. R. Lemanski, Belleville, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,317,379. **Antiseptic Materials Comprising Higher Molecular Weight Aliphatic Alcohol Polyesters of Aliphatic Amino Poly-Carboxylic Acids.** B. R. Harris, Chicago, Ill.

2,317,380. **Plasticized Compound Which Comprises Chlorinated Rubber and an Ester of Tricarballylic Acid.** E. Higgins, assignor of 50% to M. C. Meyer, both of Brooklyn, N. Y.

2,317,463. **The Method Which Includes Vulcanizing a Rubber in the Presence of a Member of the Class Consisting of Fatty Acids and Their Zinc Salts, Zinc Oxide, not over 1% of Available Sulphur, and a Mixture of Accelerators.** P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

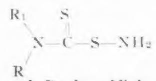
2,317,779. **Producing a Translucent Membrane-Like Material Permeable to Water, to Be Used for Making Substitute Sausage Casings, by Treating the Material with an Aqueous Solution of Proteids to Which a Small Proportion of Rubber Latex and a Vulcanizing and Accelerating Agent Has Been Admixed and Subjecting thereafter the Material to Vulcanizing and Hardening Treatments.** O. L. Janser, assignor to M. Brainos, both of London, England.

2,318,126. **Latex Adhesive Comprising an Aqueous Dispersion of Rubber Containing up to about 25% of a Lower Alkyl Ester of Crotonic Acid in Which the Alkyl Radical Contains no More than Four Carbon Atoms.** L. Spraragen, Bridgeport, Conn., assignor to Angier Products, Inc., Cambridge, Mass.

2,318,211. **Treating Styrene by Preserving It from Polymerization for Storage Purposes by Adding to the Styrene an Amount of Hexamine of a Greater Quantity than Will Dissolve in the Styrene.** S. G. Foord, London, England, assignor to International Standard Electric Corp., New York, N. Y.

2,318,212. **Inhibiting Styrene against Polymerization by Adding Hydroxylamine Hydrochloride to the Styrene.** S. G. Foord, London, England, assignor to International Standard Electric Corp., New York, N. Y.

2,318,482. **As a New Compound, an N-Substituted Thiocarbamyl Sulphamine Having the Formula**



in Which *R* **and** *R_1* **Are Aliphatic Hydrocarbon Groups.** R. S. Hanslick, Nashville, Tenn., assignor to United States Rubber Co., New York, N. Y.

2,318,669. **Producing Rubber-Like Materials from Waxes by Partially Oxidizing the Wax with an Oxygen-Containing Gas at a Temperature of Approximately 250-350° F.** D. E. Carr, assignor to Union Oil Co. of Calif., both in Los Angeles, Calif.

2,318,745. **Compounding Rubber by Mixing with It a Sulphur Vulcanizing Agent, an Activatable Vulcanizing Accelerator, and a Rubber Compounding Material.** T. A. Bulifant, Hackensack, N. J., assignor, by mesne assignments, to Allied Chemical & Dye Corp., a corporation of New York.

2,318,746. **Vulcanizing Rubber by Mixing with It a Sulphur Vulcanizing Agent, an Activatable Vulcanizing Accelerator, and a Blend of Rubber Softener.** T. A. Bulifant, Hackensack, N. J., assignor, by mesne assignments, to Allied Chemical & Dye Corp., a corporation of New York.

2,318,813. **Preserving Latex by Adjusting Its pH to not Less Than 9.8 or More Than 10 and Adding a Small Proportion of Acetaldehyde Ammonia.** W. D. Stewart, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,318,988. **Purification of Butadiene, Which Includes Bringing an Aqueous Solution of Cuprous Chloride into Contact with a Liquid Mixture of Butadiene and Butene.** D. Craig, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

411,751. **An Interpolymer of Styrene with a Preformed, Heat-Blended Resin-Frosting Drying Oil Varnish.** Canadian Industries, Ltd., Montreal, P. Q., Canada, assignee of R. B. Flint and H. S. Rothrock, co-inventors, both of Wilmington, Del., U. S. A.

411,752. **An Interpolymer of a Preformed Heat-Blended Frosting Drying Oil-Varnish Gum Varnish with a Polymerizable Ester of an Alpha-Methylene Open-Chain Aliphatic Monocarboxylic Acid.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. B. Flint and H. S. Rothrock, co-inventors, both of Wilmington, Del., U. S. A.

411,766. **Plastic Composition, Including an Ester of a Lower Aliphatic Monohydroxy Acid Esterified with an Unsubstituted Dicarboxylic Acid Intimately Associated with a Material of the Group Consisting of Cellulose Derivatives, Alkyd, and Vinyl Resins.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of T. G. Carruthers, South Charleston, and C. M. Blair, Charleston, co-inventors, both in W. Va., U. S. A.

United Kingdom

551,646. **Treatment of Rubber Latex.** C. L. Walsh and A. A. Newman.

551,666. **Preparation of Purified Latex and of Rubber therefrom.** British Rubber Producers' Research Association, (Rubber Research Institute of Malaya and V. H. Wentworth).

551,749. **Molded Articles of Polymerized Methyl Methacrylate.** S. A. Leader.

551,819. **Treatment of India Rubber and Like Substances.** Standard Oil Development Co.

551,820. **Plasticized Synthetic Linear Condensation Polymers.** Imperial Chemical Industries, Ltd.

551,852. **Oxidation Resisting Hydrocarbon and Rubber Compositions.** Standard Oil Development Co.

552,022. **Cementing of Cast Methacrylate Polymers.** E. I. du Pont de Nemours & Co., Inc.

552,023. **Coagulation of Rubber Latex.** Imperial Chemical Industries, Ltd.

552,143. **Adhesive Compositions.** E. I. du Pont de Nemours & Co., Inc.

552,227. **Extrusion of Synthetic Polymeric Materials.** E. I. du Pont de Nemours & Co., Inc.

552,340. **Vulcanized Rubber.** A. McCulloch.

552,447. **Waterproofing Compositions.** Geigy Colour Co., Ltd., and H. T. Fergusson.

UNCLASSIFIED

United States

2,317,072. **Tire Changing Tool, Including a Bar with a Fulcrum Arm near One End.** C. W. Martin, Gold Hill, Oreg.

2,317,210. **Apparatus to Separate Fabric Fragments from Rubber Fragments, Including a Flat, Repelling Electrode.** T. J. Masse, Alexandria, N. S. W., Australia.

2,317,676. **Tire Core Having Flexible Metallic Pressure Plates Hinged to Each Other, a Bearing Plate Engaging the Pressure Plates and Guide Rods Carried by the Bearing Plate.** A. A. Dorsey, Emeryville, Calif.

2,318,560. **Increasing the Mechanical Strength of Asbestos Yarn by Impregnating Yarn Essentially Composed of Asbestos Fibers with a Melamine-Formaldehyde Resin Syrup, Drying the Yarn and Polymerizing the Resin.** K. E. Ripper, Bronxville, assignor to American Cyanamid Co., New York, both in N. Y.

2,319,155. **Device to Remove a Beaded Tire from a Mounting Rim, Including a Lever Having a Handle, the Free End of Which Is Provided with a Curvedly Pointed Element.** P. F. Passanante and F. Santagata, both of Brooklyn, N. Y.

Dominion of Canada

411,930. **Apparatus to Prepare Cord for Use in Pneumatic Tires, Belts, Etc.** B. F. Goodrich Co., New York, N. Y.

412,158. **Tire Valve for Use with a Plural-Chambered Tube or the Like.** Wingfoot Corp., Wilmington, Del., assignee of B. C. Eberhard, Akron, O., and S. T. Williams, Bellerose, L. I., N. Y., all in the U. S. A.

TRADE MARKS

United States

401,050. A representation with the word: **"Penacol,"** and underneath the word: **"Penacolite."** Synthetic resins. Pennsylvania Coal Products Co., Petrolia, Pa.

401,066. **Hot-Stuf.** Gloves of leather, rubber, and fabric. Knoxville Glove Co., Knoxville, Tenn.

401,067. **Iron Mike.** Gloves of leather, rubber, and fabric. Knoxville Glove Co., Knoxville, Tenn.

401,068. **It's-a-cat.** Gloves of leather, rubber, and fabric. Knoxville Glove Co., Knoxville, Tenn.

401,069. **Load Lifter.** Gloves of leather, rubber, and fabric. Knoxville Glove Co., Knoxville, Tenn.

401,070. **White Lightning.** Gloves of leather, rubber, and fabric. Knoxville Glove Co., Knoxville, Tenn.

401,071. **Woodsman.** Gloves of leather, rubber, and fabric. Knoxville Glove Co., Knoxville, Tenn.

401,134. **Dayco.** Synthetic rubber-like compositions. Dayton Rubber Mfg. Co., Dayton, O.

401,220. Shoes. Representation of a bugle, a drum, and batons with the words: **"America's Official Band Shoe."** W. E. Lewis, R. G. Ardrey, C. O. Hall, and R. L. Daugherty, all of Huntington, W. Va.

401,246. **Flexoid.** Rubber dressing. Sillers Paint & Varnish Co., Los Angeles, Calif.

401,247. **Stenofren.** Cleansing preparation for rubber typewriter parts. Mohawk Chemical Products Co., Philadelphia, Pa., assignor to Mohawk Chemical Products, Inc., a corporation of Pa.

401,260. **Buca.** Filling and reenforcing material used in the manufacture of synthetic rubber. Moore & Munger, New York, N. Y.

401,331. **V-Cap. Tires.** Goodyear Tire & Rubber Co., Akron, O.

Recent Russian Literature on Rubber

(Continued from page 254)

pressures at which the composition of the azeotrope may differ from the composition at atmospheric pressure. Inasmuch as for these two compounds the ratio of vapor pressure equalling 1.2 remains constant between —60 and +80° C., the author concludes it is impossible to decompose this mixture by distillation.

Utilization of Waste from Synthetic Rubber Plants. M. K. Pekler. *Kauchuk i Rezina*, 9, 17-21 (1937). **S-9.**

The paper deals primarily with the utilization of waste gases. The gases leaving the scrubbers are freed of divinyl, pseudobutylene, and ethylene. These fractions are returned for use in the production of synthetic rubber. The gases are removed either by alcoholic absorption or by selective absorption with carbon. After these components are removed, the residual gas becomes enriched in H_2 up to 80-85% by volume. Various possibilities for utilizing the hydrogen are suggested. Thus it can be used for the production of methanol and ammonia. The H_2 can also be used directly for hydrogenation.

Vulcanization of Chlorovinyl Resins. P. Pavlovich and L. Martynov. *Kauchuk i Rezina*, 12, 27-29 (1937). **S-10.**

Chlorovinyl polymers contain bonds of $—CH_2=CHCl—$ combined into space complexes by van der Waals forces. When such polymers are treated mechanically, these bonds are broken, and in consequence the mechanical properties of the polymers are lowered. The introduction of divinyl benzene, dicrotonethyleneglycol, etc., strengthens the structure and thereby the mechanical properties, but lowers the solubility of the polymer and raises its melting point. These changes make impossible the use of the polymers in lacquers and make their spraying and molding more difficult. Very good results are obtained by kneading the pure polymers or polymers mixed with a plasticizer on rolls with an aqueous or alcoholic solution of a polysulphide and following the kneading with a heat treatment. The vulcanized products are thermo-stable, a property which enables their spraying. Also, they do not have the disagreeable odor of organic polysulphides. Best results are obtained without fillers. MnO_2 affects the vulcanized resins but slightly, but carbon black lowers their properties considerably.

(To be continued)

CEYLON

(Continued from page 295)

tained as storm damage, pod rot and poor germination caused serious losses later on.

An interesting method of multiplying high-yielding material is that of twinning in which each recently germinated seedling is divided to yield two plants. An investigation of the effect of the method on the growth of the resultant seedlings was started on a number of seedlings from four illegitimate families. About the same number of seedlings was left untwinned to serve as controls. One year after planting out in the field the twinned seedlings showed a loss of about 22% in girth as compared with the normal seedlings.

AFRICA

Wild rubber production in the Tshuapa district of the Belgian Congo is progressing in a satisfactory manner, it is learned. Though this district had hitherto yielded no rubber, 551 tons were collected in 1942, and if sufficient labor can be obtained, the output in 1943 is expected to reach 1000 tons.

On a recent visit to Cairo, Lord Swinton, Resident Minister of West Africa, stated that that territory is now producing more than three times as much rubber as the whole Congo. There are few rubber plantations in this district, and such as exist are for the most part derelict. However natives have been sent into the jungle to locate trees, and apparently a considerable number were found along the coast and in the interior. The rubber obtained has been pronounced as being of high quality by United States experts, Lord Swinton said.

Collaboration with Malayan experts is expected to lead to a considerable increase in the output of rubber in East Africa, N. Humphrey, senior agricultural officer for the Kenya Coast, announced on his return from a study of methods used in Tanganyika. He praised the local adaptation of the Malayan method of tapping trees instead of stabbing them as heretofore and thought it quite possible that the application of tapping systems based on those formerly used in Malaya to the exploitation of the local *Ceara* trees would cause production to be doubled.

To obtain increased yields of rubber in Uganda, £80,000 have been set aside which will be used to overhaul the local rubber estates. At the same time tapping of all rubber trees has been made compulsory. A first shipment of rubber has already been made by Uganda.

A species of *euphorbia* known in South Africa as the "gifboom," literally "poison tree," yields a milky sap which, when cut, contains rubber. The plant grows abundantly in the sandy wastes around the mouth of the Orange River where nothing else will grow. Recently Johannesburg interests sent representatives to the district to take samples of the latex for testing. It was found that the difficulties involved in separating the rubber from the resinous matter in the sap would make extraction uneconomical at the price the government has fixed.

GERMANY

Whether in anticipation of air-raids or for economic considerations, Germany has shifted her synthetic rubber industry to her eastern section. European press reports state that 12 new synthetic gasoline and rubber factories were constructed there by the Todt organization in accordance with specifications by the office of the Four-Year Plan. The new factories are working with staffs, the chief members of which have been sent out from the factories in western and central Germany.

ITALY

A new factory for synthetic rubber being constructed in Italy will soon be completed. Both Pirelli and I. G. Farbenindustrie are interested in this plant, which is said to be better equipped and to have higher productive capacity than has the first synthetic rubber factory that was built in Italy.

Market Reviews

COMPOUNDING INGREDIENTS

THE chemical market registered no drastic change in complexion during May. Demand for compounding ingredients, though increasing moderately, is doing so at a somewhat lesser rate than originally anticipated. The probability is, however, that the tempo will increase as supplies of the various synthetics become available.

CARBON BLACKS. In general, shipping schedules of carbon black have shown an upturn, which is indicative of the fact that releases of Buna S are now taking effect. One manufacturer, however, reports a slight decline which may be attributed to the rearrangement of schedules necessitated by current conditions. Stocks of channel black are ample. The S. R. furnace blacks are, of course, still tight, as the entire production is under allocation by the WPB. Additional production is now coming in and should ease this situation for the next few months. By the time the ultimate synthetic production is available, it is felt that new producing facilities will be projected and thus meet resulting demands.

CASEIN. The Stockpiling and Resources Division of the WPB has issued permits for the importation of a small quantity of casein from Argentina. Officials warn that the bars on such imports are still rigid and that future moves of this kind will depend upon the shipping circumstances at the time. The allotment totals 800 tons, a veritable drop in the chemical industries' bucket. But our government has discouraged importation from casein-rich Argentina because of that country's continued diplomatic friendship with the Axis. Officials claim, however, that shipping space is the major issue here. The imports, upon arrival in the United States, will be allocated by the WPB Chemicals Branch along with the domestic production, in accordance with order M-307.

PIGMENTS. A seasonal waning is noted in the demand for litharge. War orders continue fair-sized, but unessential operations are dwindling. Movement of lithopone into civilian production channels is slowing down, but some business is still being booked on military accounts.

WAXES. Further quantities of carnauba wax and also some shipments of beeswax from Brazil arrived without resulting in any important increase in the stocks warehoused by dealers against new orders. Forward sales obligations absorb quantities reaching the market and leave an unsatisfied margin of consumer requirements about which relatively nothing can be done at present.

ZINC OXIDE. The current demand for zinc oxide continues at a good rate. The demand has held up surprisingly well with supposedly reduced supplies of rubber available. There are some indications that larger quantities of zinc oxide are being used in some compounds as a means of saving rubber, by replacing one or more volumes of rubber, for example, with equal volumes of zinc oxide. No let-up in demand is anticipated in the near future from the rubber industry or other large consumers of zinc oxide.

Current Quotations*

Abrasives

Pumicestone, powdered	*lb.*	$0.035 / $0.04
Rottenstone, domestic	*lb.*	.025

Accelerators, Inorganic

Lime hydrated, *l.c.l.*, New York	*ton*	25.00
Litharge (commercial)	*lb.*	.09
Magnesia, calcined, heavy	*lb.*	
technical, light	*lb.*	.0625 / .07

Accelerators, Organic

A-1	*lb.*	0.28 / 0.33
A-10	*lb.*	.36 / .42
A-19	*lb.*	.52 / .65
A-32	*lb.*	.60 / .70
A-46	*lb.*	.50 / .57
A-77	*lb.*	.42 / .55
A-100	*lb.*	.42 / .55
Accelerator 49	*lb.*	.41 / .42
808	*lb.*	.59 / .61
833	*lb.*	1.13 / 1.15
Acrin	*lb.*	.65
Advan	*lb.*	.55
Aldehyde ammonia	*lb.*	.65 / .70
Altax	*lb.*	.43 / .45
Arazate	*lb.*	1.53
B-J-F	*lb.*	.38 / .43
Beutene	*lb.*	.59 / .64
Butasan	*lb.*	1.13
Butazate	*lb.*	1.13
Butyl Eight	*lb.*	.97 / .99
C-P-B	*lb.*	1.95
Captax	*lb.*	.38 / .40
D-B-A	*lb.*	1.95
Delac A	*lb.*	.39 / .48
O	*lb.*	.39 / .48
P	*lb.*	.39 / .48
Di-Esterex-N	*lb.*	.50 / .57
DOTG (Di-orthotoly-guanidine)	*lb.*	.44 / .46
DPG (Diphenylguanidine)	*lb.*	.35 / .36
El-Sixty	*lb.*	.40 / .47
Erie Accelerator	*lb.*	.60 / .62
Ethasan	*lb.*	1.13
Ethazate	*lb.*	1.13
Ethylideneaniline	*lb.*	.42 / .43
Formaldehyde P.A.C.	*lb.*	.06 / .0625
Formaldehyde-para-toluidine	*lb.*	.63 / .65
Formaniline	*lb.*	.36 / .37
Guantal	*lb.*	.39 / .48
Hepteen	*lb.*	.34 / .39
Base	*lb.*	1.25 / 1.40
Hexamethylenetetramine U.S.P.	*lb.*	.39
Technical	*lb.*	.33
Lead oleate, No. 999	*lb.*	.135
Witco	*lb.*	.15
Ledate	*lb.*	1.48
M-B-T	*lb.*	.38 / .40
M-B-T-S	*lb.*	.43 / .45
Methasan	*lb.*	1.23
Methazate	*lb.*	1.23
Monex	*lb.*	1.53
Morfex "33"	*lb.*	.67 / .72
"55"	*lb.*	.96 / 1.01
O-X-A-F	*lb.*	.38 / .43
Oxynone	*lb.*	.77 / .90
Para-nitroso-dimethylaniline	*lb.*	.85
Pentex	*lb.*	.74 / .84
Flour	*lb.*	.1225 / .1325
O	*lb.*	
Flour	*lb.*	
Phenex	*lb.*	.49 / .54
Pipazate	*lb.*	1.53
Pip-Pip	*lb.*	1.63
R & H 50-D	*lb.*	.42 / .43
Rotax	*lb.*	.48 / .50
Safex	*lb.*	1.15 / 1.25
Santocure	*lb.*	.60 / .67
Selenac	*lb.*	1.98
SPDX	*lb.*	.69 / .74
A	*lb.*	.69 / .74
Super sulphur No. 2	*lb.*	.13 / .15
Tetrone A	*lb.*	2.20
Thiocarbanilide	*lb.*	$0.28 / $0.33
Thiofide	*lb.*	.43 / .50
Thionex	*lb.*	1.53
Thiotax	*lb.*	.38 / .45
Thiurad	*lb.*	1.53
Thiuram E	*lb.*	1.53
M	*lb.*	1.53
Trimene	*lb.*	.54 / .64
Base	*lb.*	1.03 / 1.18
Triphenylguanidine (TPG)	*lb.*	.45
Tuads, Methyl	*lb.*	1.53
Tuex	*ton*	1.53
2-MT	*lb.*	0.58 / 0.60
Ulto	*lb.*	.99 / 1.04
Ureka	*lb.*	.50 / .57
Blend B	*lb.*	.50 / .57
C	*lb.*	.48 / .55
Vulcanex	*lb.*	.42 / .43
Z-B-X	*lb.*	2.45
Zenite	*lb.*	.40 / .42
A	*lb.*	.45 / .47
B	*lb.*	.42 / .44
Zimate, Butyl	*lb.*	1.13
Ethyl	*lb.*	1.13
Methyl	*lb.*	1.23
Zipacel	*lb.*	1.65

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed, and those readers interested should contact suppliers for spot prices.

Activators

Aero Ac 50	*lb.*	.46 / .52
Barak	*lb.*	.50
MODX	*lb.*	.295 / .345
SL-20	*lb.*	.1089 / .1135

Age Resisters

AgeRite Alba	*lb.*	1.95 / 2.05
Gel	*lb.*	.52 / .54
Hipar	*lb.*	.61 / .63
Powder	*lb.*	.43 / .45
Resin	*lb.*	.43 / .45
D	*lb.*	.43 / .45
White	*lb.*	1.23 / 1.33
Akroflex C	*lb.*	.53 / .65
Albasan	*lb.*	.69 / .74
Aminox	*lb.*	.43 / .52
Antox	*lb.*	.54 / .56
Betanox	*lb.*	.43 / .52
B-L-E	*lb.*	.43 / .52
Powder	*lb.*	.61 / .70
B-X-A	*lb.*	.43 / .52
Copper Inhibitor X-872-A	*lb.*	1.15
Flectol H	*lb.*	.43 / .55
White	*lb.*	.89 / 1.00
M-U-F	*lb.*	1.48
Neozone (standard)	*lb.*	.61 / .63
A	*lb.*	.43 / .45
C	*lb.*	.43 / .55
D	*lb.*	.43 / .45
Distilled	*lb.*	.48 / .50
E	*lb.*	.61 / .63
Oxynone	*lb.*	.77 / .90
Permalux	*lb.*	1.18 / 1.20
Santoflex B	*lb.*	.43 / 55
BX	*lb.*	.54 / .64
Santovar A	*lb.*	1.15 / 1.40
Stabilite	*lb.*	.48 / .69
Alba	*lb.*	.50 / .74
Thermoflex A	*lb.*	.61 / .63
C	*lb.*	.54 / .56
Tysonite	*lb.*	.165 / .1675
V-G-B	*lb.*	.43 / .52

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70 / 3.55
Liquid, 50%	100 *lbs.*	1.95
Solid (700-*lb. drums*)	100 *lbs.*	2.30 / 3.15

Antiscorch Materials

Antiscorch T	*lb.*	.90
Cumar RH	*lb.*	.105
E-S-E-N	*lb.*	.34 / .39
R-17 Resin (*drums*)	*lb.*	.1075
RM	*lb.*	1.25
Retarder W	*lb.*	.36
Retardex	*lb.*	.445 / .475
U-T-B	*lb.*	.34 / .39

Antiseptics

Compound G-4	*lb.*	1.50
G-11	*lb.*	4.50

Antisun Materials

Heliozone	*lb.*	.23 / .24
S.C.R.	*lb.*	.32 / .34
Sunproof	*lb.*	.2275 / .2775
Jr.	*lb.*	.165 / .215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	*lb.*	.0825
Unicel	*lb.*	.50

Brake Lining Saturant

B.R.T. No. 3	*lb.*	.0175 / .0185

Colors

Black

Du Pont powder	*lb.*	.42
Lampblack (commercial), *l.c.l.*	*lb.*	.15

Blue

Du Pont Dispersed	*lb.*	.35 / .95
Powders	*lb.*	2.25 / 3.75
Heliogen BKA	*lb.*	
Toners	*lb.*	

Brown			
Mapico	*lb.*	$0.1135	
Green			
Chrome	*lb.*	.25	
Oxide (*freight allowed*)	*lb.*	.24	
Du Pont Dispersed	*lb.*	.98	/$2.85
Powders	*lb.*	1.00	
Guignet's (*bbls.*)	*lb.*	.70	
Toners	*lb.*		
Orange			
Du Pont Dispersed	*lb.*	.88 /	2.35
Powders	*lb.*	2.75 /	3.05
Toners	*lb.*		
Orchid			
Toners	*lb.*		
Pink			
Toners	*lb.*		
Purple			
Toners	*lb.*		
Red			
Antimony			
Crimson, 15/17%	*lb.*		
R.M.P. No. 3	*lb.*	.48	
Sulphur free	*lb.*		
R.M.P.	*lb.*	.52	
Golden 15/17%	*lb.*		
7-A	*lb.*	.37	
Z-2	*lb.*	.25	
Cadmium, light (400-*lb. bbls.*)	*lb.*	.85 /	
Du Pont Dispersed	*lb.*	.93 /	2.05
Powders	*lb.*	.60 /	1.65
Iron Oxide, *l.c.l.*	*lb.*	.075 /	.15
Mapico	*lb.*	.096	
Rub-Er-Red (*bbls.*)	*lb.*	.0975	
Toners	*lb.*		
White			
Lithopone (*bags*)	*lb.*	.0425 /	.045
Albalith	*lb.*	.0425 /	.045
Astrolith (50-*lb. bags*)	*lb.*	.0425 /	
Azolith	*lb.*	.0425 /	.045
Titanium Pigments			
Ray-Bar	*lb.*	.055 /	.065
Ray-Cal	*lb.*	.0525 /	.0625
Rayox	*lb.*	.135 /	.165
Titanolith (50-*lb. bags*)	*lb.*	.056 /	
Titanox-A	*lb.*	.145 /	.175
B	*lb.*	.0575 /	.0625
30	*lb.*	.0575 /	.0625
C	*lb.*	.055 /	.06
RC	*lb.*	.055 /	.06
RC-HT	*lb.*	.055 /	.06
Ti-Tone	*lb.*		
Zopaque (50-*lb. bags*)	*lb.*	.145 /	
Zinc Oxide			
Azo ZZZ-11	*lb.*	.0725 /	.075
44	*lb.*	.0725 /	.075
55	*lb.*	.0725 /	.075
66	*lb.*	.095 /	.0975
French Process, Florence			
Green Seal-8	*lb.*	.09 /	.0925
Red Seal-9	*lb.*	.085 /	.0875
White Seal-7	*lb.*	.095 /	.0975
Kadox, Black Label-15	*lb.*	.0725 /	.075
No. 25	*lb.*	.085 /	.0875
72	*lb.*	.0725 /	.075
Red Label-17	*lb.*	.0725 /	.075
Horse Head Special 3	*lb.*	.0725 /	.075
XX Red-4	*lb.*	.0725 /	.075
23	*lb.*	.0725 /	.075
72	*lb.*	.0725 /	.075
78	*lb.*	.0725 /	.075
80	*lb.*	.0725 /	.075
103	*lb.*	.0725 /	.075
110	*lb.*	.0725 /	.075
St. Joe (lead free)			
Black Label	*lb.*	.0725 /	.075
Green Label	*lb.*	.0725 /	.075
Red Label	*lb.*	.0725 /	.075
U.S.P.	*lb.*	.105 /	.1075
Zinc Sulphide Pigments			
Cryptone-BA-19	*lb.*	.056 /	.0585
BT	*lb.*	.056 /	.0585
CB	*lb.*	.056 /	.0585
MS	*lb.*	.0575 /	.06
ZS No. 20	*lb.*	.0825 /	.085
86	*lb.*	.0825 /	.085
230	*lb.*	.0825 /	.085
800	*lb.*	.0825 /	.085
Sunolith	*lb.*	.0425 /	
Yellow			
Cadmolith (cadmium yellow), (400-*lb. bbls.*)	*lb.*	.60	
Du Pont Dispersed	*lb.*	1.25	/ 1.85
Powders	*lb.*	.70	/ 1.75
Mapico	*lb.*	.071	
Toners	*lb.*		

Dispersing Agents

Bardex	*lb.*	.0425 /	.045
Bardol	*lb.*	.025 /	.0275
B	*lb.*	.05 /	.0525
Darvan No. 1	*lb.*	.30 /	.34
2	*lb.*	.30 /	.34
3	*lb.*	.30 /	.34
Nevoll (*drums, c.l.*)	*lb.*	.02 /	.025
Santomerse S	*lb.*	.11 /	.25

Extenders

Advagum 1098	*lb.*	.42	
1198	*lb.*	.40	
Extendex C	*lb.*		
Naftolen	*lb.*	.15 /	.20
"600"	*lb.*	.14 /	.16
Vanzak	*gal.*	.05 /	.06

Fillers, Inert

Asbestine, *c.l.*	*ton*	20.00	
Asbestos Fiber	*ton*	15.50 /	48.00
Barytes	*ton*	$40.00	
f.o.b., St. Louis (50-*lb. paper bags*)	*ton*	25.55	
Off color, domestic	*ton*	29.00	
White, domestic	*ton*	38.50	
Blanc fixe, dry, precip	*ton*	80.00	
Calcene	*ton*	37.50 /	$43.00
Infusorialearth	*lb.*	.0225	
Kalite No. 1	*ton*	26.00	
3	*ton*	36.00	
Kalvan	*ton*	100.00	
Magnesium Carbonate *l.c.l.*	*lb.*	.0625 /	.1075
Paradene No. 2 (*drums*)	*lb.*	.0525	
Pyrax A	*ton*	7.50	
Whiting			
Columbia Filler	*ton*	9.00 /	14.00
Suprex White	*ton*	32.50	
Witco, *c.l.*	*ton*	8.00	
Witcarb	*lb.*		

Finishes

Black-Out (surface protective)	*gal.*	4.50 /	5.00
Mica, *l.c.l.*	*ton*	20.00 /	85.00
Rubber lacquer, clear	*gal.*	1.00 /	2.00
Colored	*gal.*	2.00 /	3.50
Shoe varnish	*gal.*	1.45	
Talc	*ton*	25.00	

Flock

Cotton flock, dark	*lb.*	.095 /	.11
Dyed	*lb.*	.50 /	.80
White	*lb.*	.15 /	.19
Rayon flock, colored	*lb.*	1.00 /	1.50
White	*lb.*	.90 /	1.25

Latex Compounding Ingredients

Accelerator 552	*lb.*	1.63	
Aerosol OT Aqueous 25%	*lb.*	.30	
Antox, dispersed	*lb.*	.54	
Aquarex D	*lb.*	.75	
F	*lb.*	.85	
MDL Paste	*lb.*	.25	
Areskap No. 50	*lb.*	.18 /	.24
100, dry	*lb.*	.39 /	.51
Aresket No. 240	*lb.*	.16 /	.22
300, dry	*lb.*	.42 /	.50
Aresklene No. 375	*lb.*	.35 /	.50
400 dry	*lb.*	.51 /	.65
Black No. 25, dispersed	*lb.*	22 /	.40
Casein, muriatic 30-mesh	*lb.*	.21	
Collocarb	*lb.*	.07	
Color Pastes, dispersed	*lb.*	.75 /	1.10
Copper Inhibitor X-872	*lb.*	2.25	
Dispersex No. 15	*lb.*	.11 /	.12
No. 20	*lb.*	.08 /	.10
Factex Dispersion A	*lb.*	.185	
Heliozone, dispersed	*lb.*	.25	
MICRONEX, Colloidal	*lb.*	.06	
R-2 Crystals	*lb.*	1.55	
S-1 (400-*lb. drums*)	*lb.*	.65	
Santobrite Briquettes	*lb.*		
Powder	*lb.*		
Santomerse D	*lb.*	.41 /	.65
S	*lb.*	.11 /	.25
Sodium Stearate	*lb.*	.40	
Stablex A	*lb.*	.90 /	1.10
B	*lb.*	.70 /	.95
C	*lb.*	.40 /	.50
Sulphur, dispersed	*lb.*	.10 /	.15
No. 2	*lb.*	.08 /	.12
T-1 (440-*lb. drums*)	*lb.*	.40	
Tepidone	*lb.*	.63	
Tetrone A	*lb.*	2.20	
Tysonite, dispersed	*lb.*	.32 /	.35
Zenite Special	*lb.*	.47	
Zinc oxide, dispersed	*lb.*	.12 /	.15

Mineral Rubber

Black Diamond, *l.c.l.*	*ton*	25.00 /	30.00
B.R.C. No. 20	*lb.*	.0105 /	.0115
Hydrocarbon, Hard	*lb.*	25.00 /	27.00
MilliMar	*lb.*	.055	
Parmr	*ton*		
Pioneer, *c.l.*	*lb.*	25.00 /	30.00
285°-300°	*ton*	25.00 /	27.00

Mold Lubricants

Aluminum Stearate	*lb.*	.23 /	.24
Aquarex D	*lb.*	.75	
MDL Paste	*lb.*	.25	
Colite	*gal.*	.90 /	1.15
Lubrex	*lb.*	.25 /	.30
Mold Paste	*lb.*	.12 /	.30
Rubber-Glo, conc. regular	*gal.*	.94 /	1.15
Type W	*gal.*	.99 /	1.20
Sericite	*ton*	65.00	
Soapstone, *l.c.l.*	*ton*	25.00 /	35.00
Zinc Stearate	*lb.*	.30 /	.31

Oil Resistant

A-X-F	*lb.*	.82 /	.85

Reclaiming Oils

B.R.V.	*lb.*	.035 /	.0375
C-10	*gal.*	.19 /	.24
D-4	*gal.*	.17 /	.22
E-5	*gal.*	.15 /	.20
No. 1621	*lb.*	.021 /	.0235
S.R.O.	*lb.*	.02 /	.0225
X-60 (reclaiming)	*gal.*	.20 /	.27
X-443	*gal.*	.29	

Reenforcers

Alumina, Hydrated			
Alorco C-740	*lb.*	.0375 /	.065
C-741	*lb.*	.0375 /	.065
Buca	*ton*	40.00	
Carbon Black			
Aerfloted Arrow Specification (*bags only*)	*lb.*	.0355†	
Arrow Compact Granulized	*lb.*	$0.0355†	
Certified Heavy Compressed (*bags only*)	*lb.*	.0355†	
SPHERON	*lb.*	.0355† /	$0.07
Channel "S"	*lb.*	.12	
Continental, dustless	*lb.*	.0355†	
"AA"	*lb.*		
Compressed (*bags only*)	*lb.*	.0355†	
Disperso	*lb.*	.0355†	
Dixie	*lb.*	.0355†	
Dixiedensed	*lb.*	.0355†	
66	*lb.*	.0355†	
Furnex	*lb.*	.035	
Beads	*lb.*	.035	
Gastex	*lb.*	.035 /	.06
HX	*lb.*	.0355†	
Kosmobile	*lb.*	.0355†	
66	*lb.*	.0355†	
77	*lb.*	.0355†	
S	*lb.*	.0355†	
Kosmos	*lb.*		
Dixie 20	*lb.*	.035†	
MICRONEX Beads	*lb.*	.0355†	
Hi-Tear	*lb.*	.0355	
Mark II	*lb.*	.0355	
Standard	*lb.*	.0355	
W-5	*lb.*	.0355	
W-6	*lb.*	.0355	
P-33	*lb.*	.0475	
Pelletex	*lb.*	.035 /	.06
SPHERON C (*bags*)	*lb.*	.0455†	
I (*bags*)	*lb.*	.0405	
N (*bags*)	*lb.*	.15	
T (*bags*)	*lb.*	.09	
Statex	*lb.*		
STERLING	*lb.*	.035	
Thermax	*lb.*	.0225	
"S"	*lb.*	.0675	
TX	*lb.*	.0355†	
Velvetex	*lb.*		
"WYEX BLACK"	*lb.*	.0355†	
Carbonex Flakes	*lb.*	.03 /	.035
S	*lb.*	.031 /	.036
Plastic	*lb.*	.031 /	.0335
Clays			
Aerfloted Hi-White	*ton*	10.00	
LGB	*ton*	15.00	
Paragon (50-*lb. bags*)	*ton*	10.00	
Suprex (50-*lb. bags*)	*ton*	10.00	/23.50
Catalpo, *c.l.*	*ton*	30.00	
China	*ton*	25.00	
Dixie	*ton*	10.00	/22.50
"L"	*ton*	10.00	
Langford	*ton*	8.50	
McNamee	*ton*	10.00	
Par	*ton*	10.00	
Paraforce, *c.l.*	*ton*	50.00	
#33	*ton*	30.00	
Witco, *c.l.*	*ton*	10.00	
Cumar EX	*lb.*	.05	
MH	*lb.*	.065 /	.115
V	*lb.*	.095 /	.125
465 Resin	*lb.*		
"G" Resin	*lb.*		
Nevindene	*lb.*		
Silene	*ton*	80.00 /	90.00
"EF"	*lb.*	.055 /	.06

Reodorants

Amora A	*lb.*		
B	*lb.*		
C	*lb.*		
D	*lb.*		
Para-Dors	*lb.*	.65 /	5.00
Rodo No. 0	*lb.*	4.00 /	4.50
10	*lb.*	5.00 /	5.50

Rubber Substitutes

Black	*lb.*	.095 /	.17
Brown	*lb.*	.095 /	.18
White	*lb.*	.10 /	.20
Factice			
Amberex Type B	*lb.*	.20	
Brown	*lb.*	.095 /	.19
Neophax A	*lb.*	.165	
B	*lb.*	.165	
White	*lb.*	.10 /	.20
Polyester, Millable 56-40A	*lb.*	.28 /	.36
Vulprene 72-28AR	*lb.*	.40 /	.45
Dispersion B7-41	*lb.*	.25 /	.26

Softeners and Plasticizers

Ambidex Regular	*lb.*	.25	
S	*lb.*		
B.R.T. No. 7	*lb.*	.02 /	.021
Bondogen	*lb.*	.98 /	1.05
Bunnatol (for synthetic rubber)	*lb.*		
G	*lb.*	.40 /	.50
S	*lb.*	.40 /	.50
Burgundy pitch	*lb.*		
Copene Resin	*lb.*	.32	
Dipolymer Oil	*gal.*	.33 /	.38
Dispersing Oil No. 10	*lb.*	.0375 /	.04
Falkomer 106	*lb.*	.30	
108	*lb.*	.30	
LM-Nypene (*drums*)	*lb.*	.25	
LX-436 (*tank car*)	*lb.*	.027	
Myristilene	*lb.*	.20 /	.30
Nevinol	*lb.*	.13 /	.14
Nuba resinous pitch (*drums*)			
Grades No. 1 and No. 2	*lb.*	.29	
3-X	*lb.*	.0425	
Nypene Resin	*lb.*	.32	
Palm oil (Witco), *c.l.*	*lb.*		
Palmalene	*lb.*	.15 /	
Palmol	*lb.*	.16	25

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

Para Flux (reg.)	*gal.*	$0.17 /$0.18
No. 2016	*gal.*	.135 / .19
Para Lube	*lb.*	.046 / .048
Paradene No. 1 (*drums*)	*lb.*	.0525
Special (*drums*)		
20 to 35° C. M.P.	*lb.*	.0625
35 to 45° C. M.P.	*lb.*	.0625
45 to 75° C. M.P.	*lb.*	.0575
Peptizene	*lb.*	.65
Piccocizer "30"	*lb.*	
Piccolyte Resins	*lb.*	.15 / .185
Piccoumaron Resins	*lb.*	.045 / .15
Pictar	*gal.*	.18 / .23
Pine tar	*gal.*	
Oil	*gal.*	.45
Plasticizer B	*lb.*	.35 / .45
Plastoflex No. 10	*lb.*	.20
No. 20	*lb.*	.25
Plastogen	*lb.*	.0775 / .08
Plastone	*lb.*	.27 / .30
R-19 Resin (*drums*)	*lb.*	.1075
21 Resin (*drums*)	*lb.*	.1075
Reogen	*lb.*	.115 / .12
RPA No. 1E	*lb.*	.55
2	*lb.*	.65
3	*lb.*	.46
4	*lb.*	.80
"S-Oil."	*gal.*	.15 / .20
Tackol	*lb.*	.085 / .18
Tarzac	*lb.*	.23 / .24
Tonox	*lb.*	.50 / .59
Vistac No. 1	*lb.*	.20 / .214
No. 2	*lb.*	.214 / .227
Witco No. 20. *l.c.l.*	*gal.*	.20
X-1 resinous oil (*tank car*)	*lb.*	.011 / .016
XX-100 Resin	*lb.*	.0525

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	*lb.*	.015 / .016
60°C. M.P.	*lb.*	.015 / .016
75°C. M.P.	*lb.*	.015 / .016

Solvents

Beta-Trichlorethane	*lb.*	.20
Carbon Bisulphide	*100 lbs.*	5.75
Tetrachloride	*gal.*	.80
Cosol No. 1	*gal.*	.26
No. 2	*gal.*	.25
No. 3	*gal.*	.22
Industrial 90% benzol (*tank car*)	*gal.*	.15 / .22
Nevsol	*gal.*	.245 / .31
Picco	*gal.*	.22 / .32
Skellysolve	*gal.*	

Stabilizers for Cure

Barium Stearate	*lb.*	.29 / .32
Calcium Stearate	*lb.*	.26 / .27
Laurex (*bags*)	*lb.*	.1475 / .1725
Lead Stearate	*lb.*	
Magnesium Stearate	*lb.*	.31 / .32
Stearex B	*lb.*	.15⅝ / .16⅜
Beads	*lb.*	.14⅞ / .15⅞
Stearic acid, single pressed	*lb.*	.15⅜ .16⅜
Stearite, *c.l.*	*lb.*	.1487
Zinc Laurate	*lb.*	.29 / .32
Stearate	*lb.*	.31

Synthetic Rubber

Agripol Solids *l.c.*	*lb.*	.44 / .52
Solutions *l.c.*	*lb.*	.27 / .29
Hycar OR-15	*lb.*	.63
OR-25	*lb*	.56
OS-10	*lb.*	.56
Neoprene Latex Type 571	*lb.*	.25
60	*lb.*	.36
Neoprene Type CG	*lb.*	.70
E	*lb.*	.65
FR	*lb.*	.75
G	*lb.*	.70
ILS	*lb.*	.70
KNR	*lb.*	.75
M	*lb.*	.65
Perbunan 26	*lb.*	.63
Synthetic 100	*lb.*	.41
"Thiokol" Type "A"	*lb.*	.35
"FA"	*lb.*	.50
Molding powder No. 455	*lb.*	.71
472	*lb.*	.61

Tackifiers

B.R.H. No. 2	*lb.*	.02 / .021
LX-433 (*tank car*)	*lb.*	.068
P.H.O. (*drums*)	*lb.*	.24
Plastac	*lb.*	.12

Vulcanizing Ingredients

Magnesia, light (for neoprene)	*lb.*	.25 / .26
Sulphur	100 *lbs.*	2.05
Chloride (*drums*)	*lb.*	.04
Telloy	*lb.*	1.75
Thiogen 6	*lb.*	.18 / .25
10	*lb.*	.18 / .25
Vandex	*lb.*	1.75
(See also Colors—Antimony)		

Waxes

1515-A (black)	*gal.*	1.35
C (clear)	*gal.*	1.25
Carnauba, No. 3 chalky	*lb.*	
2 N.C.	*lb.*	
3 N.C.	*lb.*	
1 Yellow	*lb.*	.8325
2	*lb.*	.8125
Carnube	*lb.*	.49 / .59
Monten	*lb.*	.12 / .17
Rubber Wax No. 118,		
Neutral	*gal.*	.76 / 1.31
Colors	*gal.*	.86 / 1.41

RECLAIMED RUBBER

IT BECAME publicly known during May that as a result of the scrap rubber drive of last summer, a final total of 867,000 tons of scrap had been collected. More than 400,000 tons of this has been purchased by the reclaimers, but the remainder plus current collections should provide ample raw material supply for a period of eighteen months to two years. Requirements for civilian recaps, which continue to be made entirely from reclaimed rubber, should keep production at a high level during this period. As synthetic rubber becomes more plentiful, its use in recap material is also indicated, which will require some modification of reclaiming technique and may affect production operations.

In order to enable dealers in hard rubber scrap to obtain a more satisfactory price for this material, the OPA on May 7 announced that effective May 12 the maximum price for hard rubber scrap should be determined in accordance with the provisions of the General Maximum Price Regulation and not under Revised Price Schedule 87 as amended (Amendment 5). This ruling means that the maximum price of $15 a ton is no longer in force and that a free market in which prices for various grades range from $5 to several hundred dollars a ton is now in effect again.

Ceiling prices on selected grades of reclaimed natural rubber are listed in the table below:

Ceiling Prices

	Sp. Grav.	¢ per Lb
Auto Tire		
Black Select	1.16-1.18	6½ / 6¾
Acid	1.18-1.22	7½ / 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Black	1.14-1.26	11¼ / 11½
Gray	1.15-1.26	12½ / 13¼
Red	1.15-1.32	12 / 12¼
Miscellaneous		
Mechanical blends	1.25-1.50	4½ / 5½
White	1.35-1.50	13½ / 14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Government Scrap Rubber Price Down

JESSE JONES, Secretary of Commerce, on May 25 announced that in compliance with a request received from the Rubber Director, the price at which tires and acceptable grades of miscellaneous scrap rubber are being purchased by Rubber Reserve Co. will be reduced from $25 per ton f.o.b. point of shipment to $15 per ton f.o.b. point of shipment, effective immediately. Miscellaneous inner tubes and tread buffings will continue to be purchased at 6¢ per pound and $25 per ton, respectively, f.o.b. point of shipment.

Rims Approved and Branded by The Tire & Rim Association

Rim Size	April, 1943
15" & 16" D. C. Passenger	
16x4.00E	23,654
16x4.25E	2,780
16x4.50E	6,067
15x5.00E	3,687
16x5.00E	3,140
15x5.00F	132
16x5.00F	3,211
15x5.50F	6,056
16x5.50F	215
16x6-L	1,444
17" & Over D. C. Passenger	
18x2.15B	2,240
Military	
16x4.50CE	109,645
16x6.50CS	48,204
20x4.50CR	7,620
20x6.00CT	13,935
22x6.00CT	980
18x8.00CV	376
20x10.00CW	1,787
24x10.00CW	2,193
Flat Base Truck	
18x4.33R (6")	202
20x4.33R (6")	30,521
18x5.00S (7")	6,397
20x5.00S (7")	285,013
15x6.00T (8")	492
20x6.00T (8")	40,539
22x6.00T (8")	14,861
20x7.33V (9/10")	18,815
24x7.33V (9/10")	1,531
20x8.37V (11")	3,382
24x8.37V (11")	1,198
24x10.00W	378
Semi D. C. Truck	
16x4.50E	2,505
16x5.50F	2,014
Tractor & Implement	
12x3.00D	1,218
16x3.00D	720
20x8.00T	318
24x8.00T	4,061
W8-24	1,793
Cast	
24x11.25	1
24x15.00	125
TOTAL	653,450

Fixed Government Prices*

	Price per Pound: Civilian Use	Price per Pound: Other Than Civilian Use
Balata		
Manaos Block	$0.38¾	$0.38¾
Swinam Sheet	.42½	.42½
Guayule		
Guayule (*carload lots*)	.17½	.31
Latex		
Normal (*tank car lots*)	.26	.43½
Creamed (*tank car lots*)	.26¾	.44¼
Centrifuged (*tank car lots*)	.27¾	.45¼
Heat-Concentrated (*carload drums*)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21⅜	.38⅞
2X Brown Crepe	.21⅛	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	†	.45
GR-S (Buna S)	†	.36
GR-I (Butyl)	†	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

*For a complete list of all grades of all rubbers, including crude, balata, guayule, synthetic, and latex, see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

†To be determined later.

COTTON & FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	Mar. 27	Apr. 24	May 1	May 8	May 15	May 22
July ..	19.86	19.96	19.96	20.22	19.74	20.00
Oct. ..	19.69	19.88	19.85	19.84	19.53	19.74
Dec. ..	19.65	19.83	19.80	19.74	19.38	19.59
Jan. ..	19.62	19.80	19.76	19.70	19.35	19.50
Mar. ..	....	....	19.78	19.73	19.35	19.37

New York Quotations

May, 25, 1943

Drills

38-inch 2.00-yard	yd.		....
40-inch 1.45-yard			....
50-inch 1.52-yard			$0.29
52-inch 1.85-yard			.23⅞
52-inch 1.90-yard		.23225	.2325
52-inch 2.20-yard			.20511
52-inch 2.50-yard			.185
59-inch 1.85-yard			.23851

Ducks

38-inch 2.00-yard D. F.	yd.	.215	.22⅝
40-inch 1.45-yard S. F.			.29¾
51½-inch 1.35-yard D. F.			.33½
72-inch 1.05-yard D. F.		.43	.45
72-inch 17-21 ounce			.48⅞

Mechanicals

Hose and belting	lb.	.42¾

Tennis

51½-inch 1.35-yard	yd.	.31½
51½-inch 1.60-yard	yd.	.27⅛
51½-inch 1.90-yard	yd.	.23⅛

Hollands—White

Blue Seal

20-inch	yd.	.13½
30-inch		.24¼
40-inch		.27

Gold Seal

20-inch	yd.	.14½
30-inch		.25¾
40-inch		.29

Red Seal

20-inch	yd.	.12¼
30-inch		.22
40-inch		.24½

Osnaburgs

40-inch 2.34-yard	yd.	.15½
40-inch 2.48-yard		.14⅝
40-inch 2.56-yard S. F.		.14578
40-inch 3.00-yard		.12¾
40-inch 7-ounce part waste		.15
40-inch 10-ounce part waste		.21⅜
37-inch 2.42-yard clean		.15¼

Raincoat Fabrics

Cotton

Bombazine 64 x 60	yd.	....
Plaids 60 x 48		....
Surface prints 64 x 60		....
Print cloth, 38½-inch, 64 x 60		.08971

Sheetings, 40-inch

48 x 48, 2.50-yard	yd.	.16200
64 x 68, 3.15-yard		.13968
56 x 60, 3.60-yard		.11944
44 x 40, 4.25-yard		.09764

Sheetings, 36-inch

48 x 48, 5.00-yard	yd.	.08600
44 x 40, 6.15-yard		.06991

Tire Fabrics

Builder

17¼ ounce 60" 23/11 ply Karded peeler	lb.	.56

Chafer

14 ounce 60" 20/8 ply Karded peeler	lb.	.55
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.55

Cord Fabrics

23/5/3 Karded peeler, 1 1/16" cotton	lb.	.56
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.54
12/4/2 Karded peeler, 1 1/16" cotton	lb.	.55
23/5/3 Karded peeler, 1¼" cotton	lb.	.56

Leno Breaker

8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.56

THE cotton graph recorded a horizontal line for May. As vital issues fluttered in the legislative and industrial breeze, the market revolved in a mist of uncertainty. Attempts are gradually being made to combat inflation by sound legislation. Cottondom watches the contest, but many are rooting for the former. For example, farm bloc members are surveying the coal wage situation as a prospect to open the way for higher priced farm products. Also, a stabilization-impeding bill was introduced to the House Committee on Banking and Currency calling for the extension of the maturity date of the 1941-42 cotton loans, the extension to be for one year after the date of the enactment of the measure. The CCC would be prohibited from selling or disposing of any of this loan cotton except upon request of the person liable on the note. The present maturity date of the 1942 loans is July, 1943, but all loans are callable on demand, and the impression is that the CCC is planning to call some of these loans in connection with the price stabilization rule.

In a new challenge to the OPA, the Senate Agricultural Committee recently came forth with the Thomas bill, which would fix a floor of *23½¢* a pound on government-held cotton, while prohibiting any ceiling on this commodity below *25¢*. This proposal would require the government to obtain at least *23½¢* a pound, on a 7/8th middling basis, at the mills, for any of the 2,700,834 bales it owns outright or the 3,451,000 on which it has loans. Present restrictions against government sale of more than 300,000 bales in any one month, or more than 1,500,000 bales in any one year, would be continued until the price reached *25¢*, after which all restrictions would be lifted. While non-government held cotton could continue to be sold at below *23¢*, sponsors predicted raises in cotton prices as a result of the measure, and the Committee amended the bill to forbid a ceiling on either free or government cotton at less than *25¢*. But in view of the President's hold-the-line policy, the Thomas formula is expected to go the way of the Bankhead and Pace bills.

Another element entered the cotton picture this month when reports circulated that Fascist Spain was again in the market for 50,000 bales of cotton, which request is said to have been fulfilled. Further releases indicate that buying from Spain may make itself evident again in the near future with increased shipments, as war developments progressively favor the United Nations. Buying for Spain is said to have been f. o. b., and it is understood that the United States Government aided in negotiating credits. For some time the Franco Government has been buying about 50,000 bales of cotton here every two months.

The New York Cotton Exchange reported that the stock of cotton in the United States at the end of April was 13,940,000 bales, compared with 13,911,000 a year earlier. On the basis of indicated distribution for the remainder of this season, the carryover on July 31 next is expected to be about 10,750,000 bales, against 10,640,000 on August 1, 1942.

The price of 15/16-inch spot middling grade dropped from *21.97¢* on May 1 to *21.29¢* on May 12, rallied to *21.96¢* on May 20 and closed at *22.09¢* on May *27*.

Fabrics

The fabrics market is dominated with government orders for essential war products. Civilian trade is taking a back seat as government needs increase. Reports circulated that to increase further the amount of raincoat sheetings available, the WPB may secure their production on former pillowcase looms.

Lend-Lease was in the market for 9,000,000 yards of carded broadcloths and print cloths and secured a moderate part of this amount. Reports indicated that textiles, especially piece goods, are now considered by Lend-Lease as the most essential item for shipment to Africa, surpassing even food in importance.

Order L-99 as amended last month simplifies construction of a number of cotton materials and increases output by ordering the particular looms covered to produce only the specified types of fabrics, with provision that if the looms are not already working on these constructions, they must convert over within the period specified by the order for each type of fabric.

Three cotton textile orders assigning A-2 ratings for procurement of certain types of cotton fabrics were amended by the WPB to bring them in line with order L-99. The orders, M-107, M-134, and M-218 define the types of fabrics which may be procured for certain purposes through use of the rating.

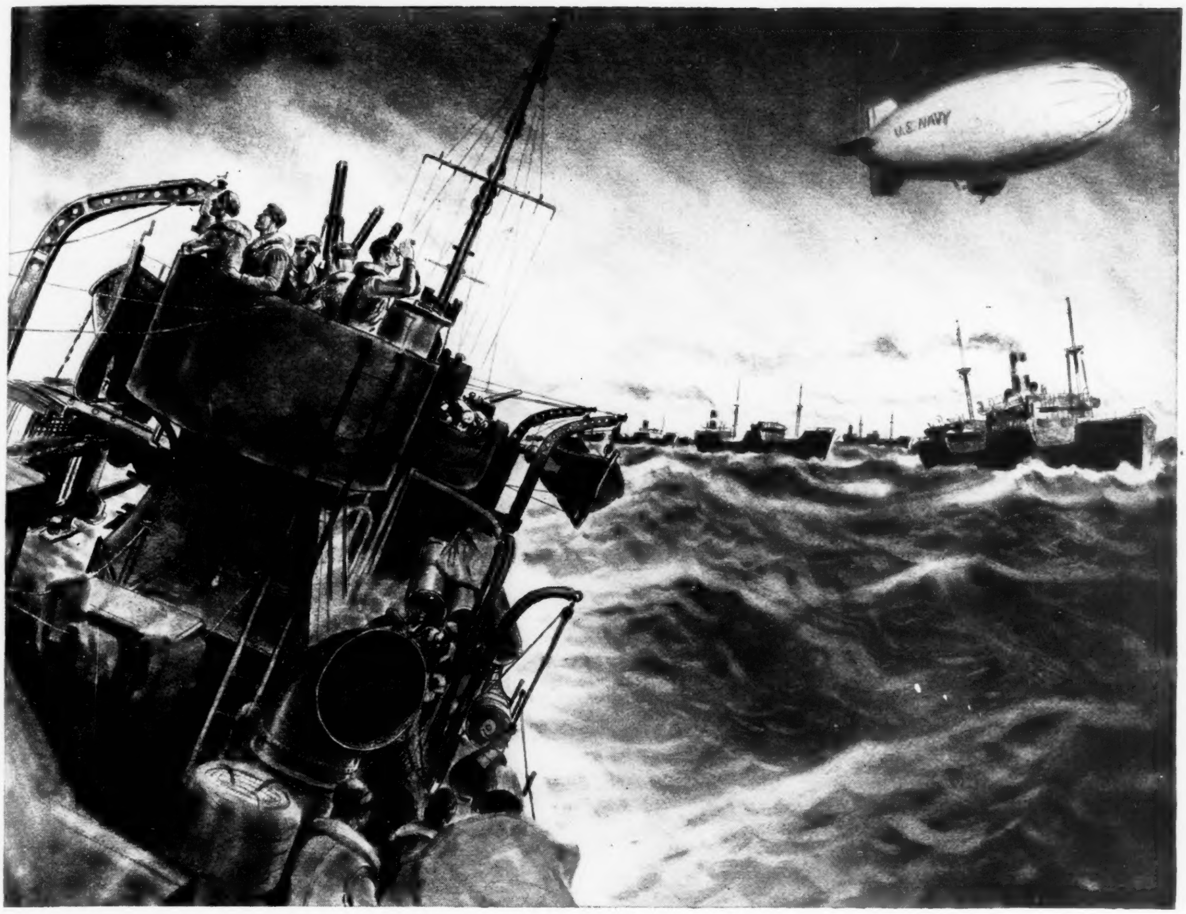
Schedule I, General Preference Order M-134, as Amended May 14, 1943, adds as cotton textile fabrics suitable for industrial cloth or tape certain constructions of the following in the original mill state: osnaburgs, sheetings, print cloths, carded lawns, and tubing. Other specifications are permissible under stated conditions. Schedule II to M-134 defines as "surgical textiles" certain constructions of the following in the original mill state: sheetings, print cloth yarn fabrics, any Class C Print or tobacco cloth (71 threads per square inch and under), and four leaf twills.

Scrap Rubber Ceilings

Inner Tubes†	¢ per Lb.
No. 2 passenger tubes	7¾
Red passenger tubes	7½
Passenger tubes	6

Tires‡	$ per Short Ton
Mixed passenger tires	18.00
Beadless passenger tires	24.00
Solid tires	34.00
Peelings†	
No. 1 peelings	47.50
No. 2 peelings	47.50
No. 1 light colored (zinc) carcass	52.50
Miscellaneous Items‡‡	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 1.15 sp. gr.	20.00
General household and industrial scrap	15.00

† All consuming centers except Los Angeles.
‡ Akron only.
‡‡ All consuming centers.


U.S. NAVY

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address.

Replies forwarded without charge

SITUATIONS WANTED

SALES REPRESENTATIVE WITH THOROUGH KNOWLEDGE OF mechanical rubber goods and all types of Plastics would like to represent manufacturers in Ohio territory. Address Box No. 595, care of INDIA RUBBER WORLD.

THOROUGHLY EXPERIENCED MAN, 38, KNOWLEDGE WASTE rubber and latex, seeks responsible position. First-class references. Speaks several languages. Address Box No. 596, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

MEXICO CITY FIRM WISHES TO EMPLOY AN experienced engineer with good salary for the manufacture of rubber articles, including those for the Railroad in accordance with American Railroad specifications. Give full experience, qualifications, etc., in first letter. Address: MANUFACTURAS DE HULE, EL MUNDO, S. A., Av. 5 de Mayo #29—Desp. 401, Mexico, D. F., Mexico.

EXCEPTIONAL OPPORTUNITY FOR GOOD RUBBER MAN IN Massachusetts factory near Boston making Rubber Tapes for the Government and supplies for essential civilian need. To relieve present excutive and later take full charge. Post-war prospects excellent. Address Box No. 584, care of INDIA RUBBER WORLD.

CHEMIST—TIRE, TUBE, OR MECHANICAL. LABoratory, control, or research. Excellent opportunity with well-established organization located in Pennsylvania. Reply all details first letter. Address Box No. 585, care of INDIA RUBBER WORLD.

MANAGER TO SUPERVISE OPERATIONS AT SEVERAL WAREhouses throughout the country. Must have knowledge of installing machinery and equipment for processing and handling and ability to handle personnel. Mechanical engineer preferred. Address Box No. 586, care of INDIA RUBBER WORLD.

RUBBER CHEMIST—ONE TO FIVE YEARS' EXPERIENCE IN rubber compounding, preferred. Good opportunity for qualified man desiring to learn mechanical rubber goods business. Address Box No. 587, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

SMALL MANUFACTURER REQUIRES A MAN TO develop synthetic rubber compounds for molded parts used in war production, with excellent post-war prospects. Our men know of this advertisement. Advise experience and salary desired. Address Box No. 590, care of INDIA RUBBER WORLD.

RUBBER CHEMIST. NORTHERN NEW JERSEY LABORATORY of nationally-known Corporation engaged extensively in rubber manufacture on war contracts requires man as project leader on development of rubber and synthetic compounds. Position requires experience in general compound development and ability to direct work of younger men. Has peacetime future, but men engaged in less essential work may be interested for the duration. Send details of age, experience, qualifications, salary expected, etc., in first letter. Confidential. Address Box No. 591, care of INDIA RUBBER WORLD.

CHEMIST-ASSISTANT CHIEF—OPENING IN MEdium-sized organization, either laboratory or plant. Tires and press goods. 100% defense with excellent post-war opportunity. Investigate if not now employed at your highest skill. All replies strictly confidential during all negotiations. Address Box No. 592, care of INDIA RUBBER WORLD.

PRODUCTION SUPERVISOR—TIRES, TUBES, mechanical goods. Opening for a high-grade director of plant activities. 100% defense with attractive post-war opportunity. Salary commensurate with ability. Address Box No. 593, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITY

FOR SALE: SMALL RUBBER FACTORY MAKING MOLDED goods; active accounts; presses, mills, molds. In New York City. Write Box No. 589, care of INDIA RUBBER WORLD.

MECHANICAL RUBBER GOODS PLANT WANTED

Substantial interests will consider acquisition of plant located Mid-West or Pacific Coast. Principals Only. Give full particulars. Confidential.

Address Box No. 588, care of INDIA RUBBER WORLD

(Classified Advertisements Continued on Page 315)

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—W. S. 15"x18" Hydraulic Press, 10" dia. ram; 2—D. & B. 20½x20½" platens; 1—14"x24" Press, 9" ram; 9—24"x55" Steel Cored Heating Platens; 1—26x66" 3-roll Calender; 1—Hydraulic Belt Press, 6'x30' with belt stretcher complete; 1—Farrel-Birmingham 15"x36" Rubber Mill; 4-W. & P. Mixers; Adamson 6" Tuber; Dry Mixers; Pulverizers; Grinders; etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: 3—HYDRAULIC PRESSES; 7—CHANGE CAN MIXERS, 8 to 40 gals.; No. 20 Banbury Mixer; W. & P. Mixers, Lab. to 200 gal.; 6—Preforming Machines; 3—Vacuum Shelf Dryers. We buy your surplus equipment for cash. BRILL EQUIPMENT COMPANY, 183 Varick Street, New York City.

FOR SALE: 2—400-TON HYDRAULIC PRESSES, 65" x 42" Platens. 1—175-Ton Hydraulic Press, 28" x 21" Platens. 1—150-Ton Hydraulic Press, 37" x 32" Platens. 1—Chambersburg Horizontal Hydraulic Pump, 3" x 12", 100 GPM, 2000#, Arr. for Geared M.D. 1—Worthington Duplex D.A. St. Dr. Hydraulic Pump, 14" x 2½" x 12", 50 GPM, 2000#. 2—Deane Triplex Vertical Hydraulic Pumps, 6" x 8", 200 GPM, 200#, Arr. for Geared M.D. 1—Weighted Accumulator, 13" x 12' Stroke Ram, 2000#, Tank 11' Diam. x 11' High. All Offered Reconditioned, Guaranteed, Prompt Shipment. Drawings and Other Data on Request. Other Sizes of Presses, Pumps, Accumulators, also Motors, Compressors, Boilers, Machine Tools, etc. INDUSTRIAL EQUIPMENT COMPANY, 870 Broad Street, Newark, New Jersey.

MACHINERY AND SUPPLIES WANTED

WANTED: BANBURY MIXER, MILLS, CALENDER, HYDRAULIC Presses, with pump and accumulator. Tubers. Any Condition. Address Box No. 594, care of INDIA RUBBER WORLD.

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